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KWIK STOP & DELI, INC
ROUTE 15
HARDWICK, VERMONT

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Prepared by:

Heindel & Noyes

Prepared for:

Union Bank

June 29, 2001

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EXECUTIVE SUMMARY

Heindel & Noyes (H&N) was retained by Mr. David Silverman, with Union Bank, to perform a Phase I Environmental Site Assessment (ESA) on the Kwik Stop & Deli, Inc located on Route 15 in Hardwick, Vermont. The investigation included research into the historical land use activities on the subject property and surrounding properties, a review of existing H&N documents, interviews with persons knowledgeable of the area, a database search to determine potential hazards, and a physical inspection of the site. In addition to the ESA work, groundwater sampling from current wells on the property was authorized.

- The subject property has been a convenience store and filling station since the 1950's.

- In 1986 the Site became a State of Vermont Hazardous Waste Site (SMS Site #87-0082). Soil and groundwater contamination was discovered on the property during the installation of a 6,000-gallon underground storage tanks (UST). Three leaking USTs (LUSTs) had been removed from the property in 1984, however, no investigation was conducted at that time. Approximately 150 yds^3 of soil was removed from the site. Active remediation occurred on the property for several years but ceased in the mid-1990s.

- There are currently three gasoline USTs on the Site (3,000-, 4,000- and 6,280-gallon). Since these tanks were installed prior to the new regulations requiring specific protections for USTs enacted in 1989, they are in violation of State and Federal law.

Any tanks installed prior to 1989 were required to be removed, replaced and/or closed before December 31, 1999.

- Water quality sampling was conducted on the Site as part of the Phase I ESA. Exceedances in the Vermont Groundwater Enforcement Standards in two of the three wells sampled were recorded. It is unknown if the contamination is residual phase hydrocarbon from the 1984 removed tanks or if the current USTs are releasing product into the subsurface.

- The Site is connected to the Hardwick Municipal Water Supply and Wastewater Treatment Plant. The Site is located within the Wellhead protection area for the Hardwick Municipal wells. The town wells are located approximately 60' to the west of the Site.

- There are three open State of Vermont Hazardous Waste Sites within ½ mile of the subject property. None of the surrounding sites appear to pose an environmental threat to the subject property.

- There was no obvious asbestos containing materials or lead based paint noted during the site inspection. However, due to the age of the facility, it is possible that these materials exist on-site. It is our recommendation to have a certified asbestos and lead inspector conduct an investigation before any remodeling, construction or demolition takes place on the property.

RECOMMENDATIONS

- Submit this report to Mr. Robert Haslam, Project Manager for this Site with the Sites Management Section (SMS).

- Proceed with the removal of the three USTs. Once the USTs are removed from the Site, a more detailed subsurface investigation should be conducted to determine the extent and severity of contamination.

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PHASE I ENVIRONMENTAL SITE ASSESSMENT

1.0 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) and groundwater quality sampling conducted at the Kwik Stop & Deli, Inc in Hardwick, Vermont. Mr. and Mrs. David and Valerie Simmons own the property. Mr. David Silverman with Union Bank retained Heindel & Noyes (H&N) to perform this ESA.

1.1 Objective

The purpose of the Phase I ESA discussed in the following text was to render an opinion regarding the environmental conditions at the Kwik Stop & Deli, Inc in Hardwick, Vermont. Adverse environmental conditions may include any past, existing, or new release of hazardous substances or petroleum products on the subject property.

The investigative procedures and reporting format used herein generally conforms to the requirements of the American Society of Testing Materials (ASTM) Standard E 1527-2000.

1.2 Scope of Services

A Phase I ESA is a research and reconnaissance-level review of a property and the surrounding area to identify potential environmental conditions. The assessment is largely dependent on direct observation of site conditions and inquiry into previous ownership and uses of the property, and review of reasonably and readily available federal, state, and local environmental records. The Phase I ESA scope of services included:

- Site history development. Review of the history of site ownership, use, and potential environmental issues based on available information obtained from interviews with persons knowledgeable of the area.
- Record searches at appropriate federal, state, and local agencies providing information pertaining to possible environmental conditions at or in the vicinity of the subject property. This includes the subject property and properties within a half-mile radius.
- Review of available historical sources such as Sanborn Fire Insurance Maps, aerial photographs, Beers Atlas and the Mannings Index.
- A site reconnaissance to observe, document, and photograph site operations, property

conditions, and signs of potential environmental liabilities, including asbestos and lead-based painted surfaces.

Additional groundwater quality sampling:

- Sampling of previously installed groundwater monitoring wells located on the property. This work was suggested prior to the ESA since it was already known that the site was a State listed Hazardous Waste Site that had not been sampled for some time.

1.3 Personnel Qualifications

Pursuant to requirements of ASTM E1527-2000, qualifications of the personnel involved with this project are provided in Appendix 6.

2.0 RELIANCE

This report was prepared solely for the use of Union Bank. The conclusions provided by H&N in this report are based on the information referenced within this document. While we are unaware of any facts or circumstances, which would cause us to suspect that the conclusions drawn herein are incorrect or misleading, it is possible that additional information could require refinement or modifications of our conclusions. This report has been prepared in accordance with and conforms to the ASTM E 1527-2000, as well as with the terms and conditions in our agreement.

3.0 SITE LOCATION AND PHYSIOGRAPHY

The Kwik Stop & Deli, Inc is located on Route 15, on the north side of Charlevoix Street in Hardwick, Vermont. A USGS topographical map and an orthophoto are included in Appendix 1, pages 1-2. A site plan and a Hardwick tax map are included as pages 3-4.

The United States Department of Agriculture (USDS) Soil Conservation Service soil survey for Caledonia County indicates that the Colton-Adams-Windsor-Agwam association underlay the site. These soils are described as deep, excessively drained, nearly level to sloping, sandy and gravelly soils on old lake beaches and terraces. This association is found in stream valleys. Old terraces, beaches, and deltas are the landforms on which these sandy and gravelly soils formed. A soils map is included as pages 5 of Appendix 1.

A surficial geology map, included in Appendix 1, pages 6-7, indicates the area to be at the interface between Littoral Sediment (LS), predominantly well sorted sand with no pebbles or boulders and Recent Alluvium (AL), the accumulation of detrital materials, which have been eroded, transported, and deposited by streams. The bedrock geology for the area is mapped as interbedded limestone and phylite of the Barton River Member, Waits River Formation (Dwb). A bedrock map is included as pages 8-9 of Appendix 1. Groundwater

flow generally follows the topography of the land. The site is located on a terrace with a steep hill to the west and a depression to the east. Groundwater flow is to the east toward the Lamoille River.

4.0 LAND AND PROPERTY USE HISTORY

Information pertaining to the land use history of the property was obtained by a review of the Town of Hardwick title records, assessors' files and tax maps, historical documents research, and a review of the Vermont Hazardous Materials Management Division's (VHMMD) files. An interview with the current owners of the property was not conducted. An Environmental Questionnaire was sent to the Simmons' via certified mail. They received the questionnaire, however it has not yet been returned to H&N.

The following table summarizes the title record information for the property. It was prepared solely for the purposes of shedding light on possible prior land uses, and does not constitute a complete title search.

TITLE RECORD KWIK STOP & DELI, INC Hardwick, Vermont					
Book #	**Page #**	**Date**	**Grantor**	**Grantee**	**Comments**
73	3-4	08/85	Roger W. & Laura J. Heath	Kwik Stop & Deli, Inc	Warranty Deed
72	243	04/12/85	Lake Realty, Inc	Roger W. & Laura J. Heath	Warranty Deed
72	240	05/12/85	Ray C. Pecor Jr.	Lake Realty, Inc	Quit Claim Deed
72	238	01/29/85	R&R Oil Company (Corporate successor of Twin City Gasoline Co., Inc	Lake Realty, Inc	Quit Claim Deed
72	236	01/29/85	Lea M. Bossi, President B&R Oil Company Inc. (Twin City Gasoline Co., Inc)	Lake Realty, Inc	Quit Claim Deed
50	484	05/20/75	M.S.U. Corporation	Ray's Mobile Homes, Inc (predecessor to Lake Realty, Inc)	Quit Claim Deed Site contains small store & filling station with USTs and mobile home
57	292	07/09/71	Village of Hardwick	M.S.U. Corporation	Warranty Deed
47	215-216	07/16/54	Village of Hardwick	Twin City Gasoline, Inc	Parcel subject to a long term lease between Village of Hardwick to Twin City Gasoline, Inc

There were no Sanborn Fire Insurance Maps, Rural Electric Maps or Mannings Index available for this site. The 1869 Beers Atlas was reviewed and is included in Appendix 1, page 10. There does not appear to be any structures on the property at that time (1869). Other historical information was obtained from interviews with the town clerk and town records review. According to the above-mentioned resources, the subject property has been a convenience store and filling station since the 1950s.

Currently there is question as to the correct property boundary on the site. According to a letter from the Merchants Bank, the adjacent property owner to the north, the property line goes through the Kwik Stop parking area where the current tanks are located. A detailed

land survey would need to be reviewed or conducted for the site. If the property line does cut through at or near that location, a significant amount of the soil and groundwater contamination that is discussed in the following pages is on the Merchants Bank property. The correspondence relating to this issue is included in Appendix 4, pages 1-3.

The following federal EPA and State of Vermont databases were searched for hazardous sites or conditions, which might have an impact on the environmental status of the subject property.

DATABASES SEARCHED

DATABASE	LIST UPDATED	STATUS
Vermont Hazardous Materials Management Division (HMMD) Active Hazardous Sites List	05/01	Site listed SMS #87-0082
Vermont HMMD Closed Sites List	05/01	Site not listed
Vermont HMMD Underground Storage Tank (UST) List*	05/01	Site listed #4728281
Vermont HMMD Pulled Facilities List*	05/01	Site listed #4728281
Vermont HMMD Spills Data Base Listing for Hardwick	05/01	Site not listed
RCRA Generators and TSD Facilities List	05/01	Site not listed
National Priorities List (NPL)	02/01	Site not listed
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	Monthly	Site not listed
CERCLIS NFRAP (No Further Remedial Action Planned)	Monthly	Site not listed
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	Monthly	Site not listed
Emergency Response Notification System (ERNS)	06/01	Site not listed

* Underground storage tanks smaller than 1100-gallons and containing heating oil are not required to be registered.

The subject property was listed on the Vermont HMMD Active Sites List along with the current and pulled UST lists.

In September 1986 petroleum contaminated soil and groundwater was encountered during the installation of a 6,000-gallon UST on the property. It was discovered that two USTs already on the site were installed in 1984 to replace two leaking USTs that had reportedly been taking in water. There is no documentation of the 1984 tank removal. Reference in the State files is also made to additional abandoned USTs that were discovered during the 1984 work.

After the release was discovered in 1986, approximately 150 yds^3 of contaminated soil was stockpiled off-site at Bellavances gravel pit in Hardwick, VT. The Vermont Department of Environmental Conservation (VDEC) Sites Management Section (SMS) subsequently placed the site on the active hazardous waste sites list, Site #87-0082. Mr. Ray Pecor, former owner of the property, accepted limited liability for the contamination and requested that the State perform the investigation into the release.

In December 1986, five groundwater-monitoring wells were installed on and around the property. One well was installed between the site and the town water supply well, which is located approximately 60' to the west of the release. Exceedances in Vermont Groundwater Enforcement levels were recorded in to of the five wells installed. The well installed between the source area and water supply did not show elevated levels of contamination. Several rounds of testing were then conducted on the water supply well and the monitoring wells on-site. It was determined that groundwater flow was to the east, away from the water supply well. A pump test was conducted on the town well in February 1987 to determine if the pumping rate of the well effected groundwater flow direction enough to draw the contaminated groundwater to it. The pump test revealed that the water supply well caused no change in groundwater flow.

In May 1987 a second round of soil sampling was conducted on the off-site soil pile. The soils showed no elevated levels of petroleum contamination and were therefore, under SMS' order, thinspread on the Kwik Stop property. In 1990, the SMS authorized the installation of a remediation system on-site. Groundwater was pumped from MW-4, the most highly contaminated well located in the former tank graves, sent through carbon and discharged into a wet area to the east of the property. Weekly sampling and monitoring was conducted. The last update report H&N reviewed in the State file was written in December 1992. The last piece of correspondence retrieved from the file was from December 1994 requesting pick up of the used carbon drums from the Site. It is unknown exactly how long groundwater pumping was conducted. All reports obtained from the State file are included in Appendix 4, pages 4-86.

5.0 NEIGHBORING PROPERTY USE

The same Federal EPA and State of Vermont databases were searched for hazardous sites or conditions on neighboring properties, which might have an impact on the environmental status of the subject property. An environmental hazards map with a ½ mile radius is located in Appendix 2, pages 1. Pages 2-5 in Appendix 2 identify the hazardous waste sites, USTs and pollution source inventory points within a ½ mile radius of the subject property. The Pollution Source Inventory (PSI) is a database that was created in 1980 and is used as a guide for potential contaminant sources. The remainder of Appendix 2 (pages 6-10) lists the potential hazards in the vicinity that are considered orphans. Orphans are sites which the State of Vermont does not have a mapped location. The potential hazards on the orphan lists consist of USTs (page 6), pulled USTs (page 7), hazardous spills (page 8), and RCRA generators and manifests (page 9-10). These lists were generated for the town of Hardwick.

What follows is our analysis after careful review of the hazards map and the orphan lists to determine if any sites pose an environmental threat to the subject property.

Area land use within ½ mile of the subject property is mixed residential and commercial. To the north and east of the Site is a drainage swale/embankment with a shopping center located further beyond the swale. Directly to the east (~250') is a propane distribution company. The site is bound on the south and southwest by a residential area and directly to the west by lands owned by the Town of Hardwick for the water supply system.

There are three active hazardous waste sites within ½ mile of the subject property (not including the subject property). HMMD SMS Site #94-1602, Hardwick House of Pizza, is located approximately 2,500' to the south; SMS Site #94-1608,Perrys' Oil, is approximately 4,200' to the north on the opposite side of the Lamoille River from the subject property and SMS Site #96-2091, Hardwick Motors Inc, is located approximately 1,600' to the north of the Site. There is one closed hazardous waste site within ½ mile of the Site, SMS Site #97-2221, Hardwick Wastewater Treatment Plant. None of these sites pose an environmental threat to the subject property due to hydrologic barriers and distance from the Site.

There are four active USTs within ½ mile of the Site (three are on the subject property). There have been eight pulled USTs recorded at the State, each of recorded contamination associated with the tanks and are currently the above-mentioned active and closed hazardous waste sites. There are eight pollution source inventory points (PSI) within ½ mile of the subject property. None of the PSI sites are located on or adjacent to the Site. There are eight registered orphan USTs for the town of Hardwick. Five of those tanks are located at the hazardous waste sites listed above and do not pose an environmental threat to the subject property. There have been eleven pulled USTs in the town of Hardwick that are registered on the State orphan list. All of these tanks are located outside of the ½ mile radius.

There are no spills recorded in the State database for the subject property. Neither the Site nor adjoining properties are listed as RCRA Generators.

6.0 PROPERTY INSPECTION

A physical inspection of the property was conducted on May 9, 2001, in order to examine the structure and grounds for the presence of hazardous materials. A photographic log of the site is presented in Appendix 3.

6.1 Building Inspection

The facility is a +/- 1,500 ft^2 wooden structure with slab on grade construction. According to an appraisal for the Site,[1] the current building on the property is approximately 20 years

[1]Appraisal Report of the Land and Improvements Located on Route #15, Hardwick, Vermont. Coull Appraisement Services. 1994.

old. According to the Town Lister, the building has been there since the 1950's. The file on the property does not have a date of building construction therefore the exact age of the building is unknown. The building only has one floor that is separated into sections; a cooler, dry goods, storage room, office, bathroom and deli. There were no floor drains noted in the facility. The building is currently heated with propane, however during the 1994 appraisal forced hot air was utilized. No petroleum aboveground storage tanks (ASTs) were noted on the Site.

There is a wooden shed located on the property as well. The shed is approximately 8'x12' and was historically used for dry goods storage and a bottle redemption center.

6.2 Grounds Inspection

The subject property is a 0.27-acre lot. Land around the property consists of paved and gravel parking areas and a small lawn area. There has been refuse dumping behind the shed at the southeast corner of the property. Garbage bags and debris was found in this area. No hazardous materials were noted.

The property is not located within a National Wetlands Inventory mapped wetland (Appendix 1, page 11). There is a Class II wetland located along the Lamoille River <500' to the east of the Site. According to the Federal Emergency Management Agency (FEMA), the Site is located within the 100 Year Flood Plain Boundary (Appendix 1, page 12).

6.3 Sewage Disposal

The facility is connected to the Hardwick Municipal Wastewater Treatment Plant.

6.4 Water Supply

The facility is connected to the Hardwick Municipal Water Supply. The source wells for the supply are located approximately 60' to the west of the Site putting it within the Wellhead Protection Area (Appendix 1, page 13).

6.5 PCB status

Cooling oil, containing PCBs, is sometimes present in older electrical transformers. The manufacture of PCB-containing transformers was banned in 1980. There was one transformer noted on the property which could potentially contain PCBs. There were no signs of leaking, and no evidence of staining was observed on the transformer or the ground beneath it

6.6 Storage Tanks

6.6.1 Active USTs

There are three gasoline USTs listed in the HMMD database on the subject property;

3,000, 4,000 and 6,250-gallon tanks installed in 1984-86. These tanks are all in violation of State and Federal law mandating the removal of all USTs installed prior to 1989. They are currently out of use and are labeled with 'DO NOT FILL' tags issued from the VDEC. We were unable to access all three tanks, however at least one the three still contains product. The pumps connected to the tanks have been removed. It is unknown if the piping still exists.

6.6.2 Removed USTs

There are three registered pulled USTs (three 1000-gallon) listed in the HMMD database on the subject property, which were removed in 1984. Reportedly, the owner and/or operator of the tanks new they were leaking when they had them replaced. However, contamination was not discovered until 1996 during the installation of an additional tank on the property.

6.6.3 Active ASTs

There are three propane ASTs located on the property.

6.7 Volatile Organic Compounds (VOCs): Screening Results

Field-testing for volatile organic compounds (VOCs) with an H-Nu Model PI-101 photoionization detector (PID), with a 10.6 eV UV lamp probe, supplemented the physical inspection of the property. The PID measures the relative levels of volatile organic compounds (VOCs) referenced to an isobutylene-in-air standard. Although PID screening cannot be used directly to quantify VOC concentrations or identify individual compounds, the results serve as a relative indicator of the presence of VOCs in the area. VOCs are often an indication of petroleum or solvent product contamination. VOCs are also often present in paints, varnishes, solvents, adhesives, and common household and institutional cleaning agents. No PID readings above background levels were noted during the building or grounds inspection.

6.8 Hazardous Materials Use

There were no hazardous materials noted on the subject property.

6.9 Asbestos

There were no obvious asbestos-containing materials noted during the property inspection. This does not constitute a formal asbestos inspection by a state-certified asbestos inspector. Since asbestos-containing materials were available when this building was built, and are still available, it is possible that there is asbestos on the property. H&N recommends having a certified asbestos inspector complete a site visit before any construction, remodeling, or demolition takes place (required by state and federal law).

6.10 Lead-based Paint

A qualitative lead test was taken using sodium bi-sulfide on a paint chip. The sample was not lead-based. This does not constitute a formal lead inspection by a state-certified lead inspector. Due to the age of the building in relation to the 1978 lead-based paint ban, it is possible that there are lead-containing materials on the property. However, the Rivers have repainted the facility in the past 6 years and did not use lead paint.

7.0 GROUNDWATER SAMPLING RESULTS

Due to the history of the site, H&N recommended conducting groundwater sampling of the monitoring wells on-site as part of the ESA. Water levels were obtained in an effort to confirm the groundwater flow direction. Elevations and survey data from previous reports is included below:

Monitoring Well	Elevation Top of Pipe	Total Depth (BTP)	Depth to Groundwater (BTP)	Groundwater Elevation (Depth to Groundwater-Top of Pipe Elevation)
MW-1	96.08	NA	NA	NA
MW-2	103.11	16.3	6.88	96.23
MW-3	93.14	18.1	9.59	83.55
MW-4	94.52	5.72	4.33	89.81
MW-5	94.32	7.12	4.30	90.02

Note: MW-2 and MW-3 elevation data is speculative; amount of well above ground surface has more than likely been altered since original survey was conducted

Since the original elevations were obtained from the Top of Pipe, the groundwater elevation data may be misrepresented due to the probable change in height of the pipe (bent and/or cut down) over the years. This table, along with groundwater contour lines included on the Site map, are to be used as a general view of groundwater flow direction only.

Groundwater samples were obtained using standard industry practices for EPA Method 8021B analysis. The results are listed below:

	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Naphthalene
VGES ppb	40	5	1,000	700	10,000	4	5	20
MW-02	<20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
MW-04	**4,510**	**118**	413	317	7,530	**702**	**1,580**	**42.3**
MW-05	**7,600**	**1,600**	**22,300**	**2,600**	**13,700**	**464**	**1,830**	<100

VGES – Vermont Groundwater Enforcement Standards
Bolded and shaded values = exceedances

There are currently two wells in violation of Vermont Groundwater Enforcement Standards (VGES) at this site. Exceedances in almost all EPA Method 8021B compounds are recorded in MW-4 and MW-5. Both of these wells are located in the historical tank graves. Due to a lack of data found in the State file on this site, it is unknown if MTBE violations

existed when the site was originally being investigated. It is possible that the levels currently being recorded are due to the 1986 tanks leaking product into the subsurface. Laboratory analysis results are included in Appendix 5.

8.0 DISCUSSION

The subject property has been a convenience store and gasoline filling station since at least the 1950s. The site is currently on the Vermont Department of Environmental Conservation Sites Management Section Active Hazardous Waste Sites List. Petroleum contaminated soils were removed from the property after the discovery of leaking USTs on the site in the mid 1980s. Those soils have since been thinspread on the property by order of the SMS after laboratory testing showed them to be free of petroleum contamination. Significant groundwater contamination was found on the property after the initial site investigation into the LUSTs. Active remediation was performed on groundwater monitoring wells placed in the source area. This was due to the fact that the Hardwick Town Water Supply Well are located approximately 60' to the west of the Site. Groundwater flow was determined to be to the east, away from the water supply wells, however, the proximity of the contamination to the wells was cause enough to require remediation. It appears that there has been no activity on the property since 1996 when the State authorized pick up of used carbon drums. The current USTs on the Site are in violation of State and Federal law, which required the replacement, removal and/or closure of all USTs installed prior to 1989. This work was to be completed no later than December 31st 1999. Recent water quality analysis on the site conducted by H&N for this ESA shows that significant contamination remains in the groundwater. It is unknown if this contamination is residual petroleum from the 1984 removed tanks or if the current 1985-86 tanks are releasing product into the subsurface.

9.0 CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- The subject property has been a convenience store and filling station since the 1950's.

- In 1986 the Site became a State of Vermont Hazardous Waste Site (SMS Site #87-0082). Soil and groundwater contamination was discovered on the property during the installation of a 6,000-gallon underground storage tanks (UST). Three leaking USTs (LUSTs) had been removed from the property in 1984, however, no investigation was conducted at that time. Approximately 150 yds^3 of soil was removed from the site. Active remediation occurred on the property for several years but ceased in the mid-1990s.

- There are currently three gasoline USTs on the Site (3,000-, 4,000- and 6,280-gallon).

Since these tanks were installed prior to the new regulations requiring specific protections for USTs enacted in 1989, they are in violation of State and Federal law. Any tanks installed prior to 1989 were required to be removed, replaced and/or closed before December 31, 1999.

- Water quality sampling was conducted on the Site as part of the Phase I ESA. Exceedances in the Vermont Groundwater Enforcement Standards in two of the three wells sampled were recorded. It is unknown if the contamination is residual phase hydrocarbon from the 1984 removed tanks or if the current USTs are releasing product into the subsurface.

- The Site is connected to the Hardwick Municipal Water Supply and Wastewater Treatment Plant. The Site is located within the Wellhead protection area for the Hardwick Municipal wells. The town wells are located approximately 60' to the west of the Site.

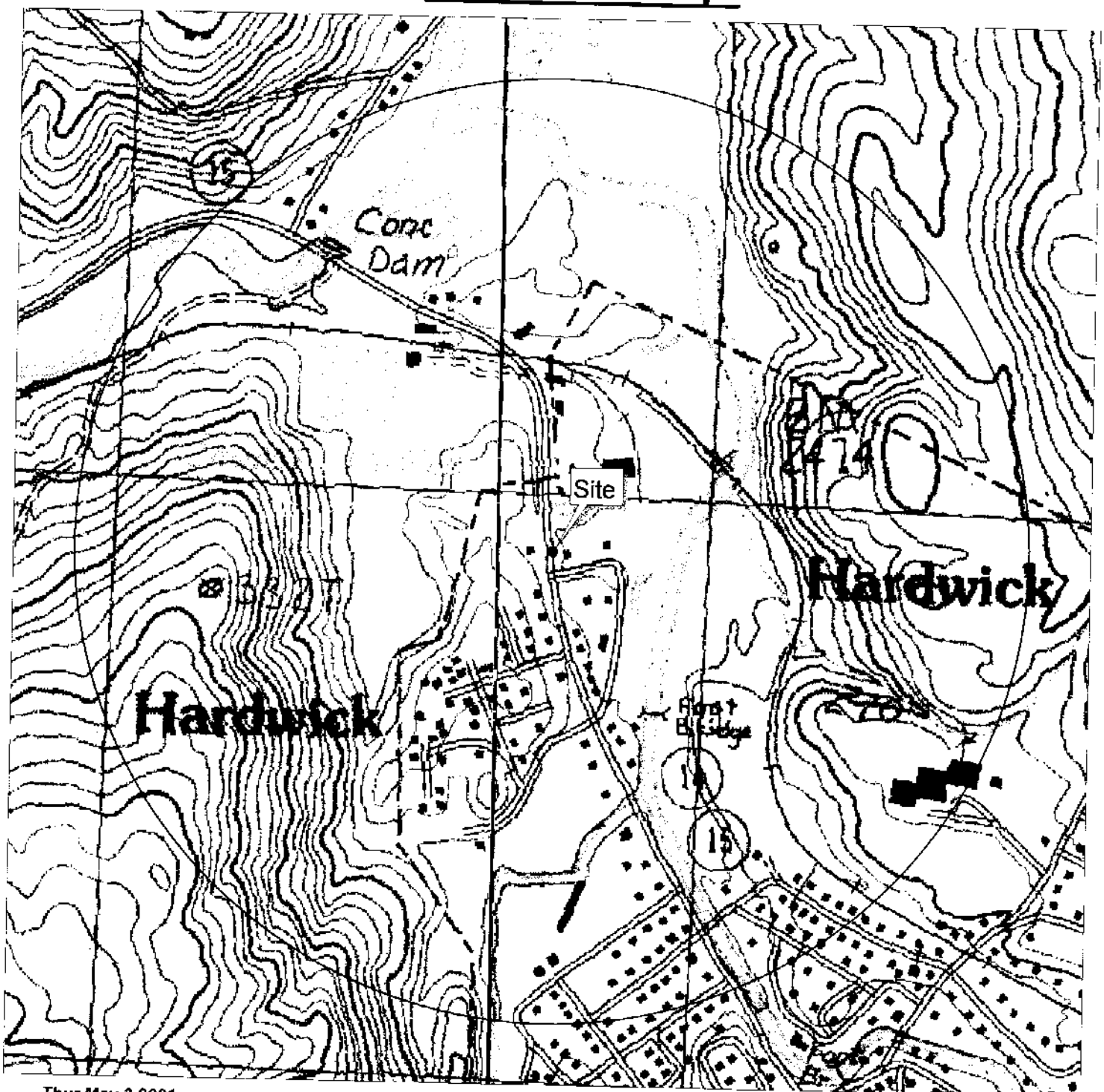
- There are three open State of Vermont Hazardous Waste Sites within ½ mile of the subject property. None of the surrounding sites appear to pose an environmental threat to the subject property.
- There was no obvious asbestos containing materials or lead based paint noted during the site inspection. However, due to the age of the facility, it is possible that these materials exist on-site. It is our recommendation to have a certified asbestos and lead inspector conduct an investigation before any remodeling, construction or demolition takes place on the property.

RECOMMENDATIONS

- Submit this report to Mr. Robert Haslam, Project Manager for this Site with the Sites Management Section (SMS).

- Proceed with the removal of the three USTs. Once the USTs are removed from the Site, a more detailed subsurface investigation should be conducted to determine the extent and severity of contamination.

USGS Map



Thur May 3 2001

1000 0 1000 Feet

Name: Kwik Stop

Address: Wolcott Street (Route 15)
Hardwick, VT

- STATE DESIGNATED HAZARDOUS WASTE SITE (Last updated 01/2001)
- OLD STATE DESIGNATED HAZARDOUS WASTE SITE (No longer on the State HWS list as of 01/2001)
- UNDERGROUND STORAGE TANK (On the 01/2001 State UST List.)
- PULLED UNDERGROUND STORAGE TANK (On the 01/2001 State Pulled UST List.)
- POTENTIAL SOURCE OF GROUNDWATER POLLUTION. (1980) (IE. LANDFILL, INDUSTRIAL WASTE, FARMING, SALT, JUNK YARD, ETC.)
- RCRA GENERATORS NOT NECESSARILY INDICATIVE OF AN ENVIRONMENTAL HAZARD (Last updated 01/2001)

N W E S

Heindel and Noyes

Prepared by

Information Visualization Services

Orthophoto Map

Thur May 3 2001

Name: ***Kwik Stop***

Address: ***Wolcott Street (Route 15)***
Hardwick, VT

● STATE DESIGNATED HAZARDOUS WASTE SITE (Last updated 01/2000)

✱ OLD STATE DESIGNATED HAZARDOUS WASTE SITE (No longer on the State HWS List as of 01/2001)

☐ UNDERGROUND STORAGE TANK (On the 01/2001 State UST List)

■ PULLED UNDERGROUND STORAGE TANK (On the 01/2001 State Pulled UST List)

✚ POTENTIAL SOURCE OF GROUNDWATER POLLUTION (1500) (IE. LANDFILL, INDUSTRIAL WASTE, FARMING, SALT, JUNKYARD, ETC.)

▼ SITE SPECIFIC DATA AVAILABLE (Current) NOT NECESSARILY INDICATIVE OF AN ENVIRONMENTAL HAZARD

⊙ RCRA GENERATORS NOT NECESSARILY INDICATIVE OF AN ENVIRONMENTAL HAZARD (Last updated 01/2001)

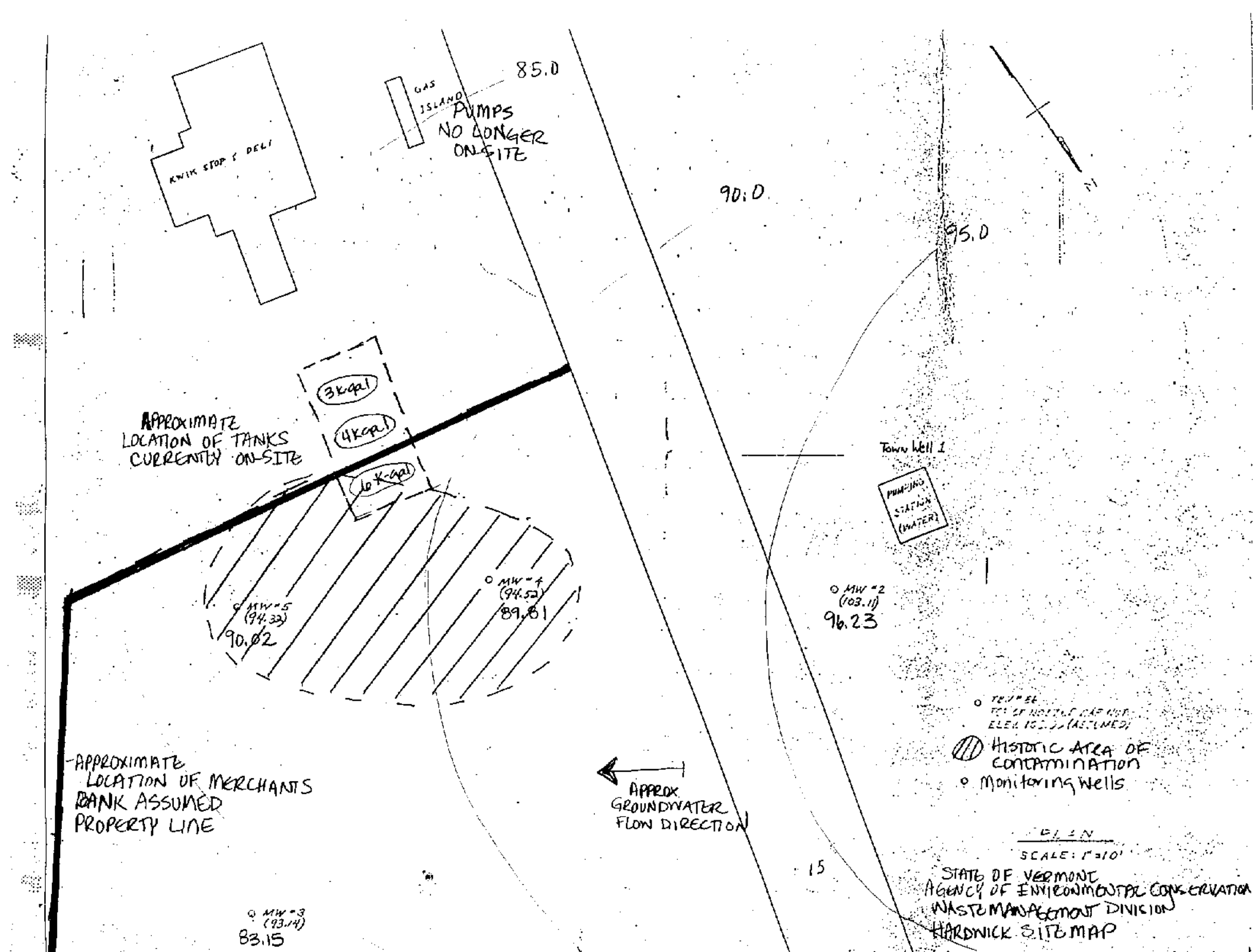
Orthophotography from 1998

N W E S

Heindel and Noyes

Prepared by

ENVIRONMENTAL VISION CORPORATION SERVICES


KWIK STOP & DELI
GAS ISLAND
PUMPS NO LONGER ON-SITE
85.0
90.0
95.0
APPROXIMATE LOCATION OF TANKS CURRENTLY ON-SITE
3K-gal
4K-gal
10K-gal
MW-5 (94.33) 90.02
MW-4 (94.52) 89.81
MW-2 (103.11) 96.23
Town Well 1
PUMPING STATION (WATER)
APPROXIMATE LOCATION OF MERCHANTS BANK ASSUMED PROPERTY LINE
APPROX GROUNDWATER FLOW DIRECTION
MW-3 (93.14) 83.15
Historic Area of Contamination
Monitoring Wells
SCALE: 1"=10'
15
STATE OF VERMONT
AGENCY OF ENVIRONMENTAL CONSERVATION
WASTE MANAGEMENT DIVISION
HARDWICK SITE MAP

13
27.5 AC

13.1
1 AC

13.2
2.2 AC

13.3
3.3 AC

14
1.1 AC

15
1.1 AC

TOWN

11
1.1 AC
(2.2 AC TOTAL)

10
3.6 AC

0.04 AC

0.6 AC

0.5 AC

18
0.7 AC

17
0.4 AC

19
1.9 AC

24
0.7 AC

25
0.5 AC

27
0.2 AC

36
1 AC

23
0.3 AC

VT RT 15-WEST

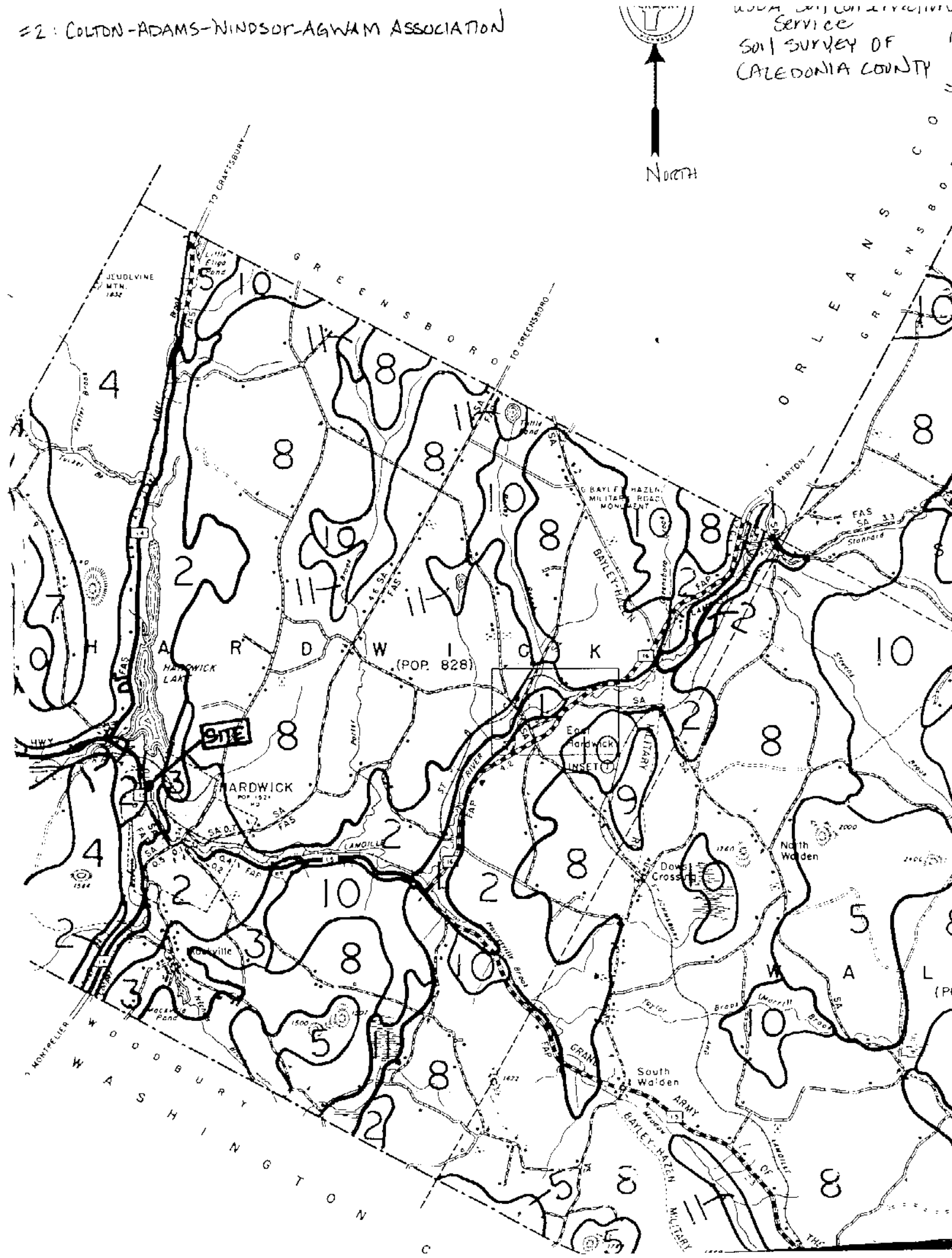
PARK ST

CHARLEVOUX ST

346'
137'
173.27'
64.93'
45.28'
240'
200'
200'
194'
180'
420'
53.1'
65'
65'
215'
118'
308.8'
308.6'
55.83'
190'
427.57'
301.57'
257'
115'
115'
20'
20'
185'
198.21'
150'
150'
37.5'
150'
150'
150'
146.05'
187.88'
150'
163'
154.57'
100'
177'
170'
169.72'
142.92'
50'
100'
95.84'
52.6'
55.4'
258'
142'
36'
22.8'
145.3'
106'
126'
30'
163'
76'
125'
118'
90'
100'
320'
68'
39'
27'
117'
178'
72'

=2 : COLTON-ADAMS-WINDSOR-AGWAM ASSOCIATION

USDA Soil Conservation Service
Soil Survey of
Caledonia County



Surficial Geology Map

Thu May 2 2001

Name: *Kwik Stop*

Address: *Wolcott Street (Route 15)*
Hardwick, VT

Heindel and Noyes

prepared by

Environmental Investigations Services

N
W E
S

1000 0 1000 Feet

SURFICIAL GEOLOGY LEGEND

GLACIAL

T

TILL

Till mantling the bedrock and reflecting the topography of the underlying bedrock surface. Thicker in the valleys and thinner on the uplands. On many exposed uplands, postglacial erosion has left only rubble and scattered boulders on the bedrock.

MORAINE

Ice marginal till accumulations with morainic topography.
M- frontal moraine assumed to be recessional.
TM- terminal moraine.

K KT KM

KAME GRAVEL

Ice contact outwash gravel.
K- isolated kame
KT- kame terrace.
KM- kame moraine, kame complex with morainic topography.

OW

OUTWASH

Horizontally bedded glaciofluvial gravel. Spillway or valley train gravel in stream valleys. May or may not have a thin vener of postglacial alluvium.

E

ESKER

A sinuous ridge of constructional form, consisting of stratified accumulations, of glacial sand and gravel.

EOLIAN

ES

EOLIAN SAND AND DUNES

Deposits of sand arranged by the wind.

GLACIOLACUSTRINE

LG BG DG D

LITTORAL SEDIMENT
PREDOMINANTLY GRAVEL

LG- horizontally bedded gravel deposited in a shoaling lake or topset beds of deltaic gravel where no foreset bedding is exposed.
BG- beach gravel.
DG- delta gravel showing foreset bedding
D- small deltas composed of sand and gravel.

LS PS BS DS

LITTORAL SEDIMENT
PREDOMINANTLY SAND

LS-well sorted sand, no pebbles or boulders.
PS- pebbly sand.
BS- sand containing ice rafted boulders.
DS- delta sand.

STC VC BC

LAKE BOTTOM SEDIMENTS

STC- silt, silty clay, and clay.
VC- varved clay.
BC- silt, silty clay, and/or clay containing ice rafted boulders.

WAVE-WASHED TILL

Till from the top of which the finer materials have been removed by wave action, leaving boulder concentrations on the surface.

BEACH RIDGE

A linear accumulation of beach material, behind the beach which was created from waves or other action.

POSTGLACIAL FLUVIAL

FG

FLUVIAL GRAVEL

Gravel laid down by a river or a stream.

FS

FLUVIAL SAND

Sand laid down by a river or a stream.

AL

RECENT ALLUVIUM

Accumulations of detrital materials, which have been eroded, transported, and deposited by streams.

CHAMPLAIN SEA

BGM

MARINE BEACH GRAVEL

MS PSM

MARINE SAND

MS- marine sand without pebbles or boulders.
PSM- pebbly marine sand.

MARINE CLAY

GB

GRAVEL BAR

A natural mound or exposed face of gravel.

PLUVIAL

SWAMP, PEAT and/or MUCK

BR

BEDROCK EXPOSURES

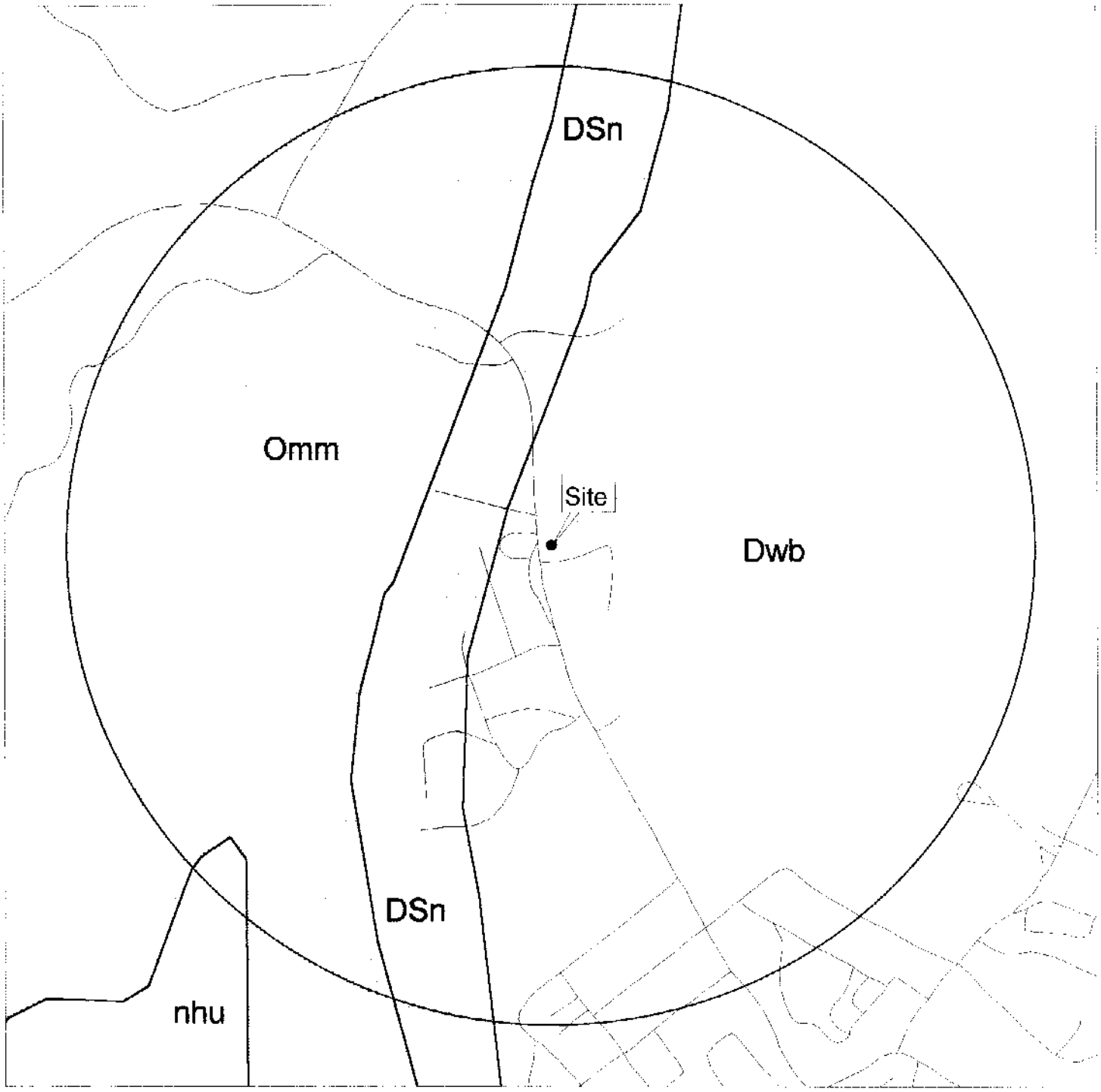
Solid filled bedrock was taken directly from the state source maps.
Hatch filled bedrock represents generalized centerlines with a 25m buffer.

SOURCE NOTES:
Surface Geology was digitized and scanned, by Wagner, Heindel, and Noyes, into a PC ARC/INFO database from 1:62500 original State of Vermont surficial geology base maps (1956-1966). These base maps were created under the supervision of David P. Stewart (1956-1966), Paul MacClintock (1963-1968), William F. Cannon (1964), G. Gordon Connally (1965), Parker E. Calkin (1965), Robert F. Behling (1966), and William W. Shilts (1966). Surficial data for most of the state is available, in 15 minute quads, from WHN (802) 658-0820.
Generalized Bedrock Outcrops were digitized from 1:62500 state surficial geology maps as linear features, which were buffered to 25m. Data available from WHN with surficial geology coverages
Road Centerlines were generated from pre-1990 1:5000 orthophotos (or better). Road data (RDSnn) is available from the Vermont Center for Geographic Information, VCGI (802) 656-4277.
Linear Surface Waters are Digital Line Graph Data, generated from 1:24,000 USGS topographic maps. This data is available from VGIS.
Town Boundaries were digitized from pre-1990 1:24000 USGS topographic maps. This coverage was created by the EPA and is available through VGIS

Legend derived from 1:250,000 Surficial Geologic Map of Vermont (1970)

INFORMATION & VISUALIZATION SERVICES
P.O. Box 54708 - Burlington, Vermont - 05406-4708 - Tel: (802) 865-0437 - Fax: (802) 865-0314

Bedrock Geology Map



Thu May 2 2001

N a m e : ***Kwik Stop***
A d d r e s s : ***Wolcott Street (Route 15)***
Hardwick, VT

Heindel and Noyes

Prepared by:

N
W E
S

1000 0 1000 Feet

BEDROCK GEOLOGY LEGEND

Road Centerline

Town Boundary

No Label
Features with no label were not attributed on the original source maps.

Surface Water

Topographic Contours

100 Foot Intervals
500 Feet Above Sea Level
1000 Feet Above Sea Level
1500 Feet Above Sea Level
2000 Feet Above Sea Level
2500 Feet Above Sea Level
3000 Feet Above Sea Level
3500 Feet Above Sea Level
4000 Feet Above Sea Level

Faults

Thrust Fault, Upper Plate to West
Thrust Fault; Upper Plate to East
Uncertain Thrust Fault, Upper Plate to West
Uncertain Thrust Fault; Upper Plate to East
Reverse Fault; Upthrown Side to West
Reverse Fault; Upthrown Side to East
Reverse Fault; Location Uncertain
Normal Fault Downthrown Side to West
Normal Fault; Downthrown Side to East
Normal Fault; Location Uncertain

PLUTONIC ROCKS

PERMIAN OR TRIASSIC
White Mountain Plutonic-Volcanic Series

wls
Rhyolite - Many small leucophyres and lamprophyres not shown

wg
Biotite and hornblende granites

ws
Hornblende, biotite, quartz and augite syenites

wn
Nepheline syenite and pulaskite

wd
Peridotite, theralite, diorite, gabbro

we
Essexite

wv
Volcanic breccia, tuff, lahars, tuff and flows

DEVONIAN
New Hampshire Plutonic Series

Bethlehem Gneiss - Two-mica granodiorite gneiss

nhu
Undifferentiated granitic rocks
Small dikes and sills do not show

nhd
Metadiorite - Metagabbro, metanorthosite and metadiorite too small to show are chiefly in the Mesozoic, Albee and Ottauquechee formations

Oliverian Plutonic Series

Biotite quartz and diorite gneiss

ORDOVICIAN
Highlandcroft Plutonic Series

Undifferentiated granitic rocks

Ultramafic rocks
ub - dunite, peridotite and serpentinite
ut - serpentinite, carbonate rock, calc-silicate rock and skarn
uu - undifferentiated ultramafic rocks

CAMBRIAN ROCKS

Bridgeman Hill Formation
Undifferentiated dolomite, slate and conglomerate

Brezee formation
Cbr - phyllite with beds of calcareous marble, sandstone, beds of massive calcite-dolomite locally
Cbrc - quartzose green phyllite

Cheshire Quartzite

?Ccr ?Ccs
Cavendish Formation
?Ccr - Restriction Member: quartz-muscovite-schist
?Ccg - Gulf Hill Grelse: quartz-plagioclase-microcline-biotite gneiss
?Ccm - buff dolomite

Ccs
Clarendon Springs, Ticonderoga, and Rock River Dolomites: Gonge Formation

Cd
Dunham Dolomite

Cds
Danby and Potsdam Formations
Interbedded quartzite and dolomite.

Dalton Formation
Schistose quartzite, impure dolomite, and conglomerate

Cf
Forestdale Marble

Chb Chm Chg
Hazens Notch Formation
Chb - interbedded carbonaceous and noncarbonaceous schist
Chm - Ratcliffe Mountain Amphibolite Member
Chm - schist
Chg - greenstone

Chcg Chcg
Hoosac Formation
Chc - quartz-sericite schist
Chcp - Plymouth Member: quartzite and carbonaceous phyllite
Chf - Turkey Mountain Member: amphibolite and greenstone
Chng - amphibolite and greenstone

Chw
Tlie Hatch Hill and West Castleton Formations
Hatch Hill - calcareous quartzite
West Castleton - siltstone, carbonaceous slate

Monkton Quartzite

Cmo
Moosalamoo Phyllite

Co
Ottauquechee Formation
Carbonaceous phyllite or schist containing beds of massive quartzite.

Cpt
Pinnacle Formation
Cp - schistose greywacke.
Cpg - Tibbit Hill Variant Member

Cpa
Parker Slate

Cph Cpgg Cpg Cpc
Pinney Hollow Formation
Cph - Pale green phyllite with abundant magnetite.
Cpgg - Chester Amphibolite Member
Cpg - greenstone and schistic greenstone
Cpc - carbonaceous phyllite and schist

Crb
Rugg Brook Formation
Dolomite, conglomerate, and sandstone.

Cws Cwc Cwm Cwr
Sweetsburg Formation
Cs - carbonaceous slate.
Cwm - Hungerford Slate Member
Cw - Rockledge Conglomerate Member
Cwm - Shiels Corner Slate and Mallets Creek Conglomerate members, undifferentiated
Cwa - St. Albans Slate Member

Cwb
Saxe Brook Dolomite

Csc Csct
St. Catherine Formation
Csc - slate and phyllite.
Csct - Persimmon Greywacke Member
Csct - Zion Hill Member: quartzite and greywacke

Cl
Tyson Formation
Schist, conglomerate at base: phyllite and dolomite in upper portion

Cu Cue Cuc Cuc
Underhill Formation
Cu - gray-green schist
Cuq - Barnes Pond Member: quartzite schist
Cue - greenstone
Cuc - carbonaceous schist and phyllite
Cuw - White Brook Member: sandy dolomite with amygdaloid limestone
Cul - Pinnacle Member: sandy dolomite and limestone
Cuj - Jay Peak Member: schist, locally quartzite
Cuh - Hall Knob Member: schist, mica, carbonaceous interbeds
Cus - Mount Ascutney Schist Member
Cub - Butterfield Member: carbonaceous schist and sometimes quartzite
Cup - Peaked Mountain Member: greenstone

Cw
Winooski Dolomite
Buff-weathered drab, buff and gray dolomite with thin platy argillaceous partings.

ORDOVICIAN ROCKS

OCs
Stowe Formation
OCs - phyllite and schist
OCsc - carbonaceous schist and phyllite
OCsg - greenstone and amphibolite

Pinney Hollow, Ottauquechee, and Stowe Formations, undifferentiated
Quartz-rich calcareous schist, and schistose quartzite.

Oa
Ammonoosuc Volcanics

Oal
Albee Formation
Quartzite interbedded with slate and phyllite.

Ob
Bascom Formation, and undifferentiated Lake Hill, Naylor Ledge and Hastings Creek Limestones
Ob - rib-bedded dolomite, limestone or marble, sandstone, quartzite and limestone pebble
Obt - Brownell Mountain Phyllite Member

Oc
Cutting dolomite, and undifferentiated Morgan Comor and Wallace Creek Formations

Ocbr
Chipman, Bridport, and Beldens Formations; Providence Island Dolomite
Ocb - Bridport Dolomite Member
Ocbe - Beldens Member: dolomite with limestone and marble scarps
Ocw - Weybridge Member: limestone
Ocb - Burchards Member: limestone with beds of dolomite

Cumberland Head Formation
Interbedded shale and limestone.

Ogo
Glens Falls and Orwell Limestones, undifferentiated

Glens Falls Formation
Highly fossiliferous limestone.

Hortonville Formation
Pyritic slate and phyllite with limy beds.

Oha
Hathaway Formation
Argillite and bedded radiolarian chert.

Ohg
Hortonville, or Cumberland Head, and Glens Falls Formations, undifferentiated

Oi
Iberville Formation
Noncalcareous black shale interbedded with calcarenite

Highgate Formation
Banded limestone and calcareous shale

Mississquoi Formation
NORTHERN VERMONT
Omc Omcc Omc Omu
SOUTHERN VERMONT
Omc Omsb Omw
STATEWIDE
Omm
Omm - Quarry Hill Member: dolysite, grades locally to dark slate.
Omhp - Hazens Bridge Quartzite Member
Omch - Cathcart Hill Volcanic Member: greenstone and amphibolite, includes pillow lavas.
Omc - carbonaceous phyllite and slate
Omu - Umpenaki Hill Member: quartz and slate pebble conglomerate
Omc - carbonaceous mica schist, quartzite and micaceous quartzite
Omb - Barnard Volcanic Member: gneiss and amphibolite.
Omw - Wilmington Hill Member: carbonaceous phyllite and schist
Omm - Monkton Member: quartzite and quartz-oligoclase gneiss

Mount Hamilton Formation
Hard swiss, some interbedded with quartzites and schist

Omlv Omvc Omd Omld
Middlebury and Chazy Limestones; undifferentiated Youngman and Carman Formations
Omd - Dunmore Member: dark gray calcareous limestone with dolomite and shaly interbeds
Omlv - Valcour Member: dark gray calcareous limestone interbedded with dolomite and shaly interbeds
Omvc - Crown Point Member: fossiliferous limestone
Omd - Day Point Member: calcareous quartz sandstone and calcarenite.

Morses Line Formation
Calcareous and noncalcareous slate, locally with limestone interbeds.

Oar
Orwell Limestone, and Isle La Motte and Fairville Limestones

Oop
Ordville Formation
Ocr - carbonaceous phyllite
Oos - Sunday Mountain Volcanics: greenstone and schists
Oop - West Pond Volcanics: greenstones and schist.

Opr Opv
Partridge Formation
Op - Mt. Holly - basic carbonaceous slate and phyllite with beds of fine tuff. Bf VT - carbonaceous mica schist.
Opv - volcanics - mafic gneiss and amphibolite

Opwl
Pawlet Formation
Locally carbonaceous and pyritiferous, micaceous slate

Shelburne, Whitehall, and Strites Pond Formations
Chiefly a white marble or limestone with gray dolomite interbeds

Stony Point Formation
Calcareous black shale grading upward into argillaceous limestone.

SILURIAN ROCKS

Sc
Clough Formation
NE VT - conglomerate with cobbles of quartzite and schist, quartzite and schist marble.
SE VT - quartzite, quartz-conglomerate and mica schist.

Sf
Fitch Formation
NE VT - weathered, sandy limestone.
SE VT - granulite, impure limestone and dolomite, and mica schist

Ss
Shaw Mountain Formation
N VT - quartzose limestone and calcareous quartzite
S VT - quartzite, quartz conglomerate, conglomeratic schist, and biotite and schist.

DEVONIAN ROCKS

DSh
Northfield Formation
Quartz arkosic slate of phyllite with siltstone and limestone interbeds

Dga Dgm
Gale Mountain Formation
Dg - quartz-muscovite phyllite or schist.
Dgh - Hall Stream Member: feldspathic gn, probably volcanic, schist or amphibolite
Dga - amphibolite.
Dgm - Meetinghouse Slate Member

Littleton Formation
Gray slate and phyllite with interbeds of schistose quartzite.

Dw Dwq Dwc Dwb Dwa
Waits River Formation
Dw - quartzose and micaceous crystalline limestone.
Dwa - Nursery Pond Volcanic Member: amphibolite and garnet schist
Dwc - Corse Hill Member: fine gray quartzite of S. Albans region.
Dwb - Berlin River Member: interbedded limestone and phyllite; dolomite
Dwa - Avery Cliff Limestone Member

PRECAMBRIAN ROCKS

pC pCsc
Mount Holly Complex
pC - mafic gneiss and inclusions in coarse schistic
pCsc - quartzite, micaceous quartzite, and quartz mica schist
pCm - calcsilicate and dolomite marbles

Undifferentiated gneissic biotite granite, quartz monzonite, and granodiorite

Gneiss, quartzite, calc-silicate granulite

Stamford Gneiss
Granitic biotite gneiss with megacrysts of microcline

SOURCE NOTES:
Bedrock Geology was digitized and scanned, by Wagner, Heindel, and Noyes, into a PC ARC/INFO database from 1:62500 original State of Vermont bedrock geology base maps (1956-1966). These maps were made available by Dr. Barry Doolan, Geology Department Chairperson, University of Vermont. Bedrock data for most of the state is available, in 15 minute quads, from IVS (802) 865-0437.
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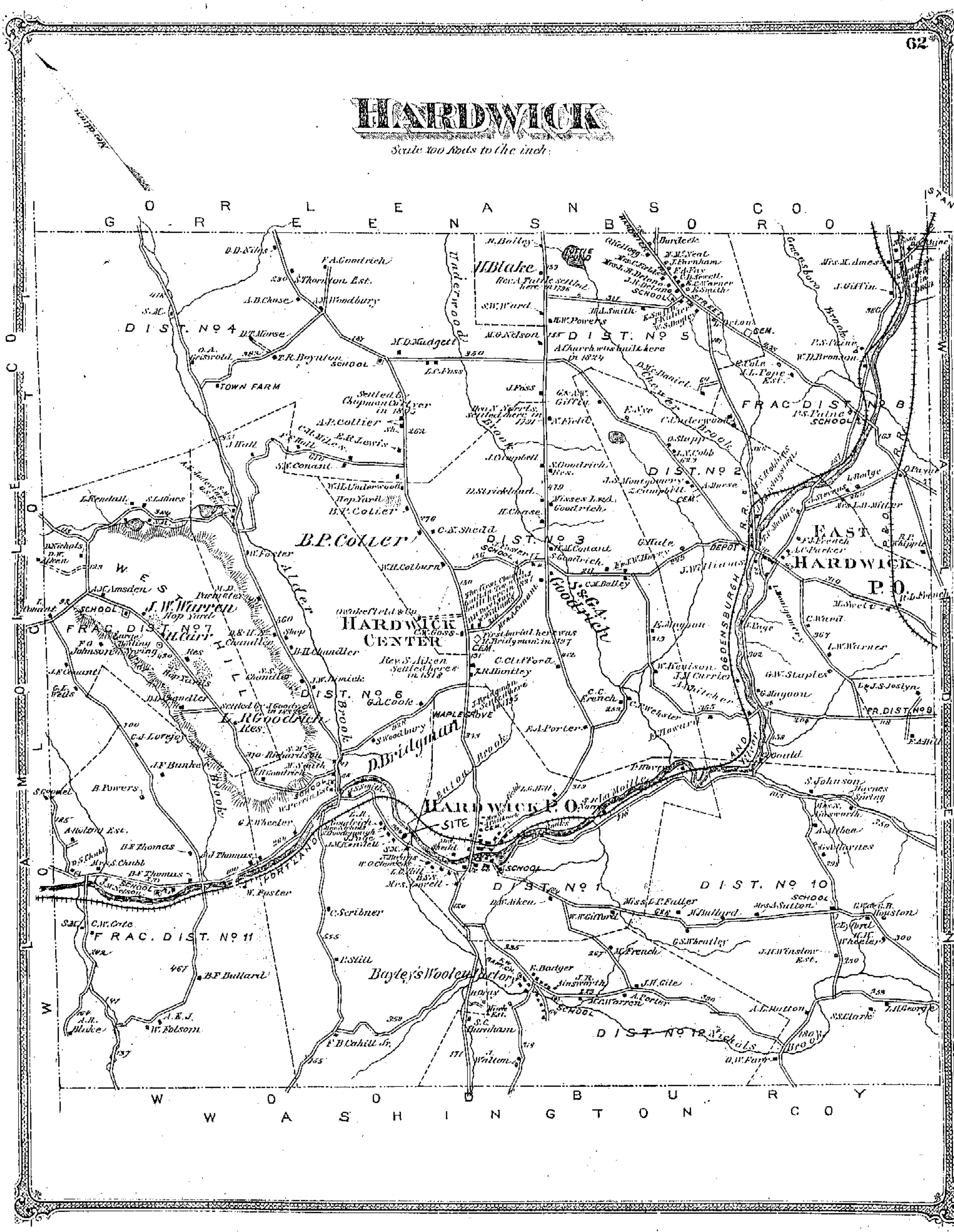
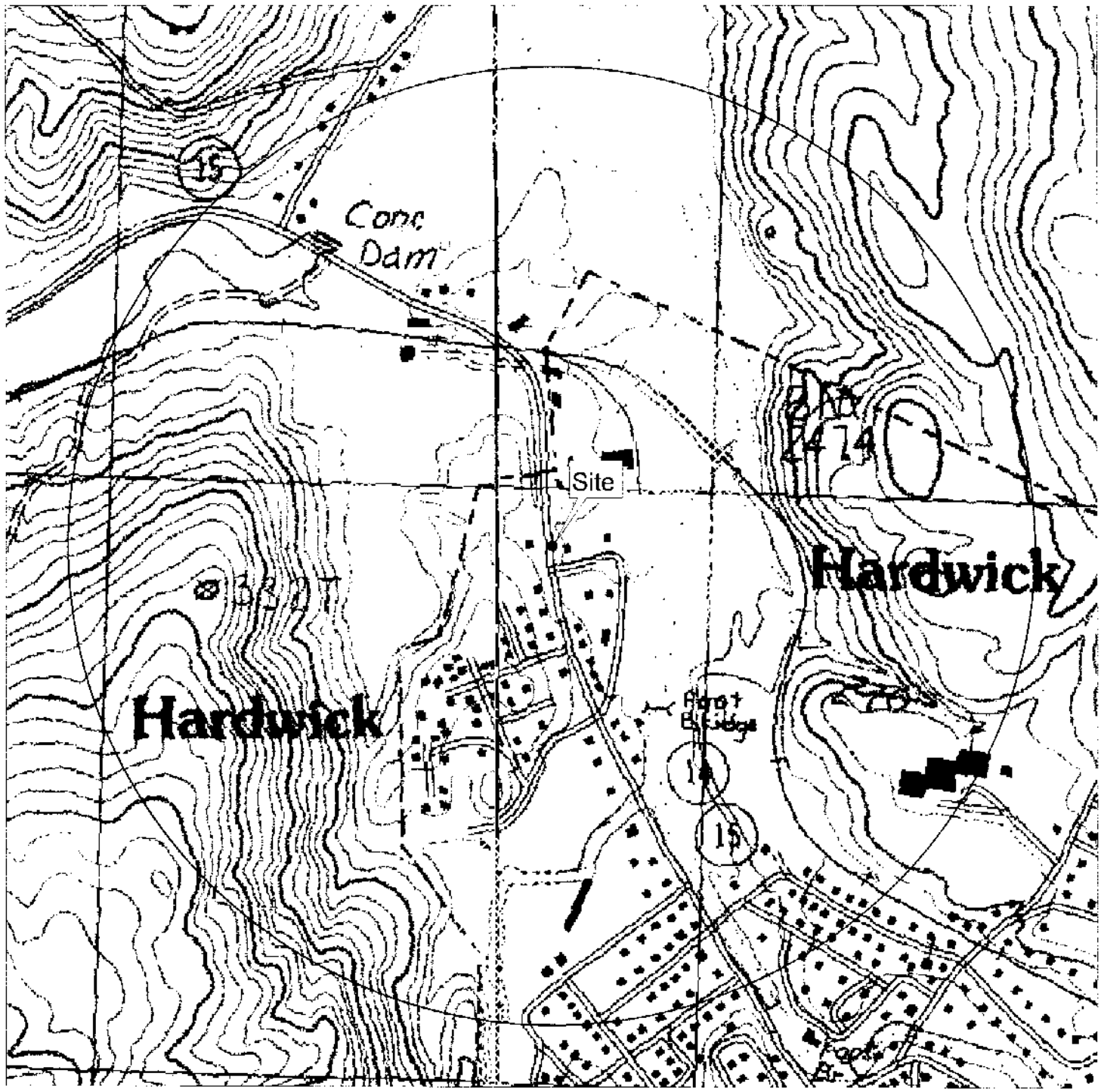

HARDWICK
Scale 100 Rods to the inch.
ORLEANS CO.
GREENSBORO
STANNARD
WALDEN
WOODBURY
WASHINGTON CO.
WOLCOTT
LAMOILLE CO.
HARDWICK CENTER
HARDWICK P.O.
EAST HARDWICK P.O.
WEST HILL
DIST. No 1
DIST. No 2
DIST. No 3
DIST. No 4
DIST. No 5
DIST. No 6
FRAC. DIST. No 7
FRAC. DIST. No 8
FR. DIST. No 8
DIST. No 10
FRAC. DIST. No 11
DIST. No 12
TOWN FARM
SCHOOL
DEPOT
CEM.
MAPLE GROVE
SITE
Bayley's Woolen Factory
PORTLAND AND OGDENSBURGH R.R.
Alder Brook
Greensboro Brook
Cheney Brook
Underwood
Nichols Brook
J.W. Warren
B.P. Collier
D. Bridgman
L.R. Goodrich Res.
J.S. & G.A. Goodrich
M. Blake
A Church was built here in 1824
First burial here was H. Bridgman in 1797
Rev. S. Aiken Settled here in 1818

Wetlands Map



Thur May 3 2001

Name: ***Kwik Stop***

Address: ***Wolcott Street (Route 15)***
Hardwick, VT

N
W E
S

National Wetland Inventory (NWI)

Heindel and Noyes

Prepared by

FEMA Flood Map

Thur May 3 2001

1000 0 1000 Feet

Name: Kwik Stop

Address: Wolcott Street (Route 15)
Hardwick, VT

Heindel and Noyes

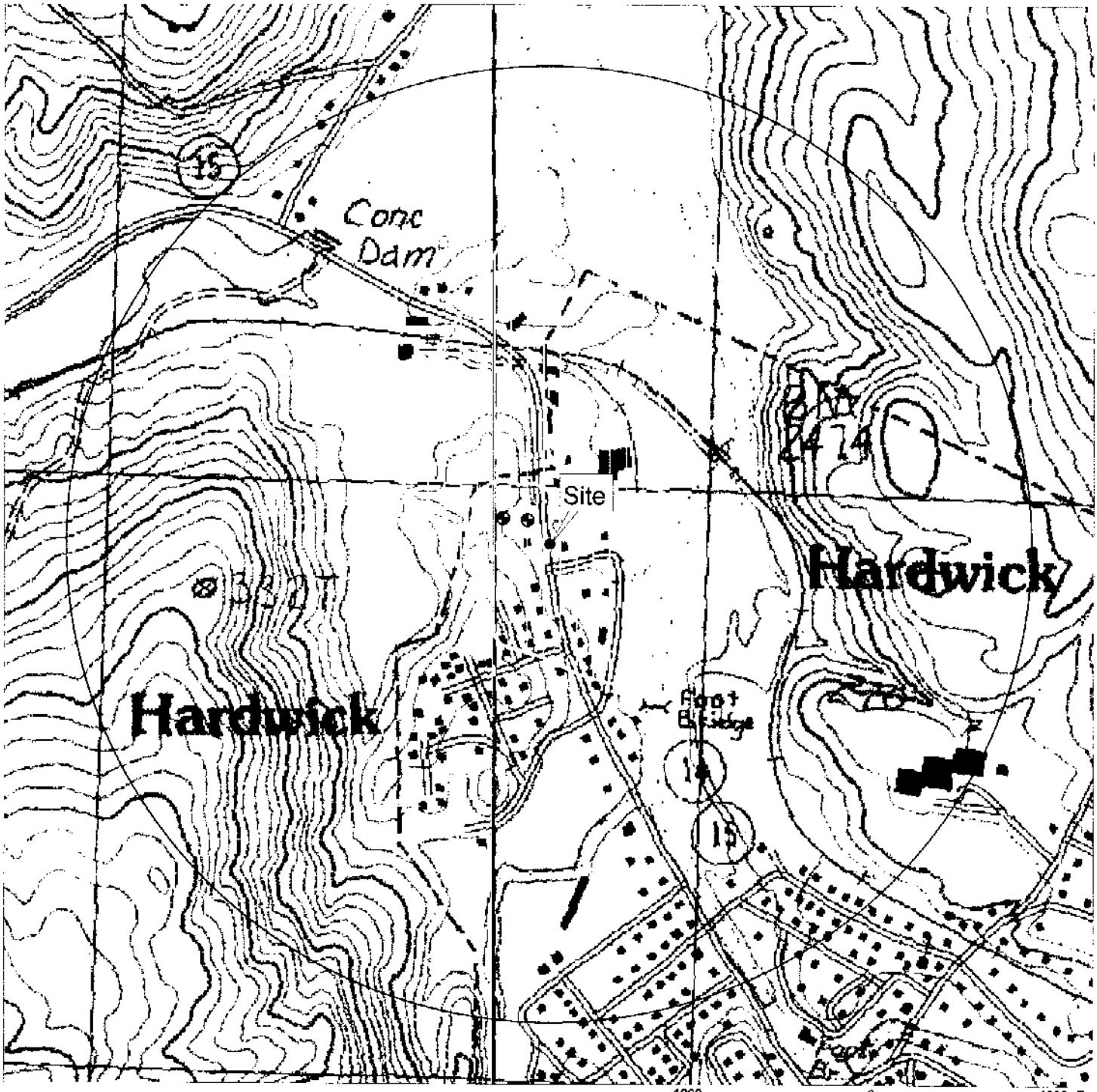
Prepared by

N
W E
S

100 Year Flood Plain Boundary

Orthophotography from 1998

Wellhead Protection Areas & Wells Map



Thu May 2 2001

N a m e : ***Kwik Stop***

A d d r e s s : ***Wolcott Street (Route 15)***
Hardwick, VT

Heindel and Noyes

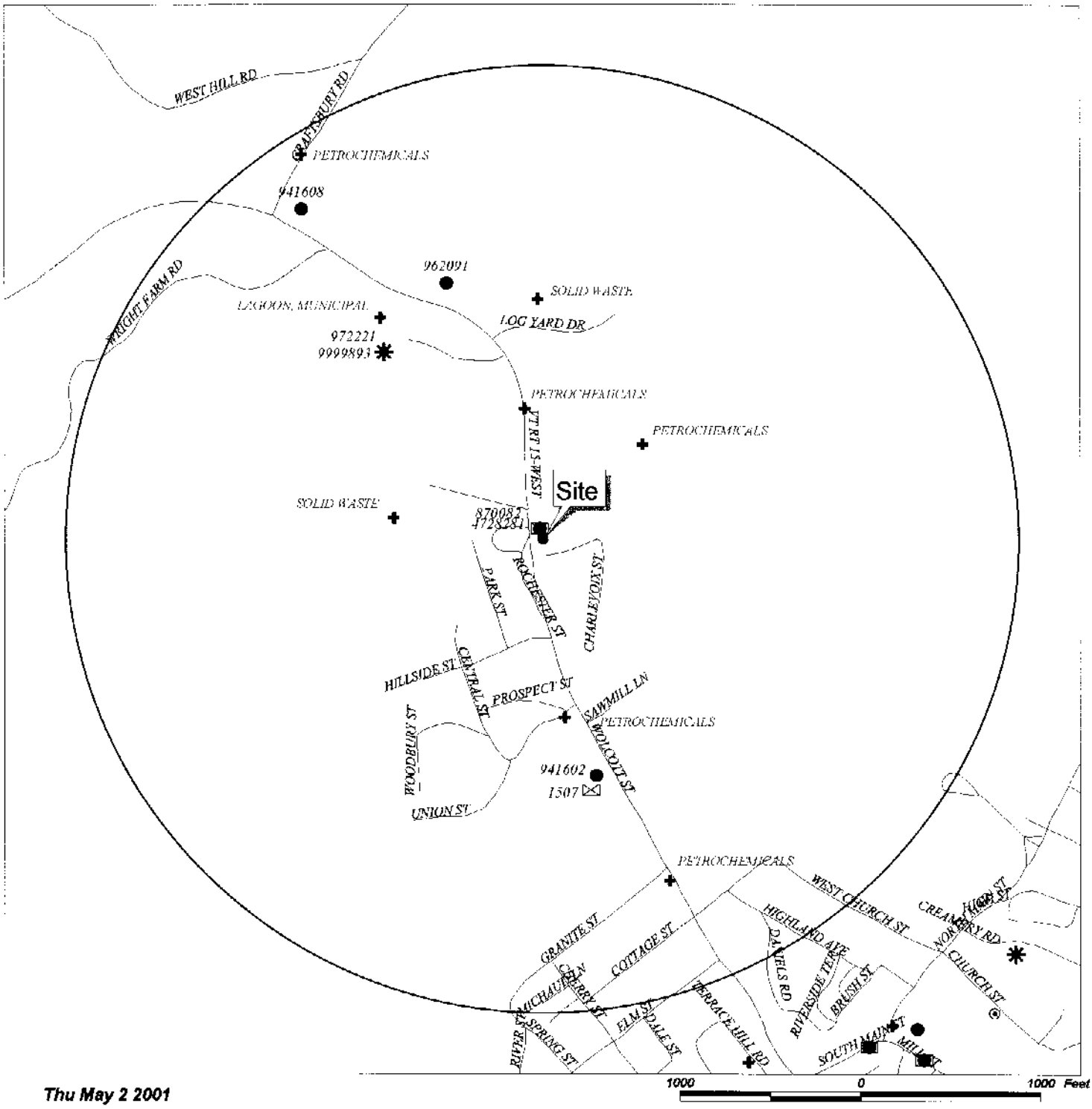
Prepared by

N
W E
S

Wellhead Protection Areas (WHPA)

WHPA Source Well

Property Screening Service



Thu May 2 2001

N a m e : ***Kwik Stop***

A d d r e s s : ***Wolcott Street (Route 15)***
Hardwick, VT

- STATE DESIGNATED HAZARDOUS WASTE SITE. (Last updated 01/2001)
- OLD STATE DESIGNATED HAZARDOUS WASTE SITE. (No longer on the State HWS List as of 01/2001)
- UNDERGROUND STORAGE TAKE (On the 01/2001 State UST List.)
- PULLED UNDERGROUND STORAGE TANK (On the 01/2001 State Pulled UST List.)
- POTENTIAL SOURCE OF GROUNDWATER POLLUTION. (1980) (IE LANDFILL, INDUSTRIAL WASTE, FARMING, SALT JUNK YARD, ETC.)
- RCRA GENERATORS NOT NECESSARILY INDICATIVE OF AN ENVIRONMENTAL HAZARD. (Last updated 01/2001)

Orce Radius 0.5 miles

Map Center (State Plane Meters)
Easting: 169454
Northing: 203557

N W E S

Heindel and Noyes
Hydrogeology Ecology
Environmental Engineering
CONSULTING SCIENTISTS AND ENGINEERS

Prepared by
INFORMATION VISUALIZATION SERVICES

Hazardous Waste Sites

Kwikstop

SITE NUMBER
870082

PRIORITY
MED

ADDRESS
Rt 15 Hardwick

01/01
Remediation Complete, Monitoring Ongoing

10/00
Remediation Complete, Monitoring Ongoing

07/00
Remediation Complete, Monitoring Ongoing

House Of Pizza

SITE NUMBER
941602

PRIORITY
MED

ADDRESS
Route 15 Hardwick

01/01
Reviewing Workplan 4/98

10/00
Reviewing Workplan 4/98

07/00
Reviewing Workplan 4/98

Perrys' Oil

SITE NUMBER
941608

PRIORITY
HIGH

ADDRESS
Route 14 and 15 Hardwick

01/01
Impacted Water Supply Replaced, Monitoring Ongoing

10/00
Impacted Water Supply Replaced, Monitoring Ongoing

07/00
Impacted Water Supply Replaced, Monitoring Ongoing

Hardwick Motors Inc

SITE NUMBER
962091

PRIORITY
MED

ADDRESS
Wolcott St Hardwick

01/01
Additional Monitoring Points

10/00
Additional Monitoring Points

07/00
Additional Monitoring Points

Hardwick Wastewater Treatment Plant

SITE NUMBER
972221

PRIORITY
SMAC

ADDRESS
Rt 15, Wolcott Rd Hardwick

01/01
Investigation completed. No groundwater contamination. Site closed.

10/00
Investigation completed. No groundwater contamination. Site closed.

07/00
Investigation completed. No groundwater contamination. Site closed.

Vermont Underground Storage Tanks

Hazardous ID:	1507
Tank ID:	1983-1-R
Facility:	Hardwick House of Pizza
Facility Address:	Route 15
Tank Install:	6/2/97
Tank Capacity:	8000
Substance:	GS

Hazardous ID:	1507
Tank ID:	1983-2-R
Facility:	Hardwick House of Pizza
Facility Address:	Route 15
Tank Install:	6/2/97
Tank Capacity:	8000
Substance:	GS

Hazardous ID:	1507
Tank ID:	1983-3-R
Facility:	Hardwick House of Pizza
Facility Address:	Route 15
Tank Install:	1994
Tank Capacity:	10000
Substance:	DZ

Hazardous ID:	1507
Tank ID:	1997-1-2
Facility:	Hardwick House of Pizza
Facility Address:	Route 15
Tank Install:	
Tank Capacity:	20000
Substance:	GS

Hazardous ID:	4728281
Tank ID:	-1-1-R
Facility:	Kwik Stop and Deli
Facility Address:	Wolcott Street Route 15
Tank Install:	
Tank Capacity:	1000
Substance:	-1

Hazardous ID:	4728281
Tank ID:	-1-2-R
Facility:	Kwik Stop and Deli
Facility Address:	Wolcott Street Route 15
Tank Install:	
Tank Capacity:	1000
Substance:	-1

Hazardous ID:	4728281
Tank ID:	-1-3-R
Facility:	Kwik Stop and Deli
Facility Address:	Wolcott Street Route 15
Tank Install:	
Tank Capacity:	1000
Substance:	-1

Hazardous ID:	4728281
Tank ID:	1985-1
Facility:	Kwik Stop and Deli
Facility Address:	Wolcott Street Route 15
Tank Install:	
Tank Capacity:	3000
Substance:	GS

Hazardous ID:	4728281
Tank ID:	1985-2
Facility:	Kwik Stop and Deli
Facility Address:	Wolcott Street Route 15
Tank Install:	
Tank Capacity:	4000
Substance:	GS

Hazardous ID:	4728281
Tank ID:	1986-3
Facility:	Kwik Stop and Deli
Facility Address:	Wolcott Street Route 15
Tank Install:	
Tank Capacity:	6250
Substance:	GS

Pulled Underground Storage Tanks

Tank ID:	1978-1	*Tank ID:*	1978-2
Pulled ID	9999893	*Pulled ID*	9999893
Facility:	Hardwick Wastewater Treatment Plant	*Facility:*	Hardwick Wastewater Treatment Plant
Address:	Route 15 Wolcott Road	*Address:*	Route 15 Wolcott Road
Town:	Hardwick	*Town:*	Hardwick
# Tanks Pulled:	2	*# Tanks Pulled:*	2
Tank Pull Code:	C	*Tank Pull Code:*	C
Pulled Year:		*Pulled Year:*	

PULL CODE

A No contamination found; (less than 1 ppm by PID)

B Contamination found but below PID standards (20 ppm for gasoline, 10 ppm for diesel)

C Contamination above standards

D No state inspection or site assessment at the tank pull

E Tank closed in-place

Pollution Source Inventory

SITENUM:	
PSITYPE:	

SITENUM:	
PSITYPE:	

SITENUM:	HDC04
PSITYPE:	PETROCHEMICALS

SITENUM:	HDC06
PSITYPE:	PETROCHEMICALS

SITENUM:	HDC12
PSITYPE:	PETROCHEMICALS

SITENUM:	HDC13
PSITYPE:	PETROCHEMICALS

SITENUM:	HDC17
PSITYPE:	PETROCHEMICALS

SITENUM:	HDL02
PSITYPE:	SOLID WASTE

SITENUM:	HDL04
PSITYPE:	SOLID WASTE

SITENUM:	HDP01
PSITYPE:	LAGOON, MUNICIPAL

Orphan Underground Storage Tanks

03-May-01

FACILITY	ADDRESS	TOWN	HAZARDOUS ID	TANK ID	YEAR	CAPACITY	SUBSTANCE
East Hardwick Mini Mart	Route 16	Hardwick	248	1989-1		6000	1
East Hardwick Mini Mart	Route 16	Hardwick	248	1989-2		8000	1
East Hardwick Mini Mart	Route 16	Hardwick	248	1989-3		10000	1
Perry's Oil	Junction Routes 14 and 15	Hardwick	1740	1979-1-R	1993	2000	1
Perry's Oil	Junction Routes 14 and 15	Hardwick	1740	1979-2-R	1993	4000	1
Perry's Oil	Junction Routes 14 and 15	Hardwick	1740	1993-1		20000	1
Hardwick Motors Inc	Wolcott Street	Hardwick	4725967	1985-1		4000	1
Hardwick Motors Inc	Wolcott Street	Hardwick	4725967	1985-2-R	1998	550	1

Orphan Pulled Underground Storage Tanks

03-May-01

FACILITY	ADDRESS	TOWN	TANK ID	HWS ID	# PULLED	PULL CODE
Gebbie's Service Stati	South Main Street Off	Hardwick	1959-1	**********	3	A
Gebbie's Service Stati	South Main Street Off	Hardwick	1959-2	**********	3	A
Gebbie's Service Stati	South Main Street Off	Hardwick	1959-3	**********	3	A
Northeast Service Cent	Wolcott Street	Hardwick	-1-1	**********	2	D
Northeast Service Cent	Wolcott Street	Hardwick	-1-2	**********	2	D
Dona's Car Store		Hardwick	-1-1	**********	3	A
Dona's Car Store		Hardwick	-1-2	**********	3	A
Dona's Car Store		Hardwick	-1-3	**********	3	A
O'Malley Fuel	Route 14	Hardwick	-1-1	**********	2	B
O'Malley Fuel	Route 14	Hardwick	-1-2	**********	2	B
Merchants Bank	Wolcott Street	Hardwick	-1-1	**********	1	A

PULL CODE

- **A** No Contamination found; (less than 1 ppm by PID)
- **B** Contamination found but below PID standards (20 ppm for gasoline, 10 ppm for diesel)
- **C** Contamination above standards
- **D** No state inspection or site assessment at the tank pull
- **E** Tank closed in-place

Information and Visualization Services (IVS), PO Box 64709, Burlington, VT - Tel (802) 885-0437

Orphan Vermont Hazardous Spills

03-May-01

SPILL NUMBER	YEAR	TYPE	QUANTITY		TOWN	LOCATION
095	1975	Gasoline			Hardwick	Brousseaus Exxon
091	1978	#2	200	G	Hardwick	Hardwick Electric
017	1980	Diesel	50	G	Hardwick	Rt 15-rt 16
063	1980	Gasoline			Hardwick	Hays Texaco
111	1980	Maure,oil,diesel	2000	G	Hardwick	
184	1981	# 2	10	G	Hardwick	Hardwick Power Plant
202	1981	Diesel	10	G	Hardwick	
074	1985	Waste Oil	75		Hardwick	Rts 15 & 14
104	1988	Heating Oil			Hardwick	
166	1988	Oil			Hardwick	Rt 15 Hay's Service Sta.
010	1991	# 2	182	G	Hardwick	Rt 14
104	1991	Oil			Hardwick	Rt 15
191	1991	Gasoline			Hardwick	
220	1991	Diesel Fuel	100	G	Hardwick	Rt 15
097	1993				Hardwick	Rt 15
301	1993	Transformer Oil			Hardwick	Rt 15
WMD048	1995	Gasoline	5	G	Hardwick	Wolcott St
WMD162	1995	White Goods			Hardwick	
WMD350	1995	#2	100	G	Hardwick	Glenside Ave
WMD072	1996	Gasoline	40	G	Hardwick	Rt 15
WMD345	1996	Gasoline			Hardwick	Rt 14
WMD022	1999	auto fluids			Hardwick	Rt 14
WMD034	1999	#2	35	g	Hardwick	84 Church St
WMD201	1999	paint thinner	15	g	Hardwick	22 Church St
WMD258	1999	petroleum			Hardwick	909 Bridgeman Hill
WMD365	1999	waste oil, gasoline			Hardwick	Route 14
WMD134	2000	mixed chemicals			Hardwick	126 Hazen Union Drive
WMD433	1999	#2			Hardwick	West Hill Rd
WMD453	1999	unknown			Hardwick	Rt 15
WMD220	2000	gasoline	40	g	Hardwick	N Main St
WMD461	2000	kerosene			Hardwick	Rt 16

******** Unknown Value

Orphan RCRA Generators

03-May-01

FACILITY NAME	FACILITY STREET	TOWN	EPA ID#	PHONE	BUSINESS TYPE
GREENSBORO GARAGE INC.		HARDWICK	VT5000001230		
ROWELL'S BODY SHOP		HARDWICK	VT5000001917		
HARDWICK RECYCLING & SALVAGE		HARDWICK			
HARDWICK MOTORS INC		HARDWICK	VTR000002907		
DONA'S CAR STORE INC		HARDWICK	VTR000005124		
HARDWICK ELECTRIC DEPT		HARDWICK	VT0000808269		
LAFONTS' WOOD PRODUCTS		HARDWICK			
WALDON FARM PERFUMES		HARDWICK			
R.F.D. AUTOS		HARDWICK			
BARCOMB MOTOR SALES GMC TRUCK		HARDWICK	VTD019109917		
HARDWICK ELECTRIC DEPARTMENT		HARDWICK	VTD027921428		
CASPIAN ARMS LTD.		HARDWICK			
NORTHEAST SERVICE CENTER OF HARDWICK		HARDWICK			
TRI-CORP ENERGY SYSTEMS		HARDWICK			
GATES SALVAGE		HARDWICK	VTR000012086		
WRIGHT'S AUTO EXCHANGE		HARDWICK			
CHAPIN'S		HARDWICK			
DEMAR'S GARAGE		HARDWICK			
HAYS SERVICE STATION	MILL ST	HARDWICK			
FRED'S AUTO BODY REPAIR		HARDWICK		742-3705	
L.G. BELEVANCE & SONS		HARDWICK			
SWEET & BURT	CREAMERY STREET	HARDWICK	VTR000006148	527-7755	
LANPHEAR SALES & SERVICE	WOLCOTT STREET	HARDWICK	VTR000006221	472-6850	
BROCHUS CITGO SERVICE	RT 15	HARDWICK	VTR000006361	472-8282	
DRAPER & SONS SCRAP METAL	ROUTE 15	HARDWICK			
ESSEX ARMS	LOWER INDUSTRIAL PARK	HARDWICK		472-6515	
MIKE'S SERVICE CENTER INC	22 SOUTH MAIN STREET	HARDWICK		472-8296	AUTO SERVICE

Orphan RCRA Manifests

BRIDGE 2

EPA ID	ADDRESS	SUBSTANCE	QUANTITY	UNITS	DATE	DESCRIPTION
VTP000006223	OVER LAMOILLE RIVER RTE 15	VTP000007814	0.00	RTE	1995-10-23	No info from state

GREENSBORO GARAGE

EPA ID	ADDRESS	SUBSTANCE	QUANTITY	UNITS	DATE	DESCRIPTION
VT5000001230	RTE 15	VTP000002730	0.00	ROU	1996-02-08	No info from state
VT5000001230	RTE 15	VT5000001230	0.00	RTE	1996-06-04	No info from state
VT5000001230	RTE 15	VT5000001230	0.00	RTE	1996-06-04	No info from state
VT5000001230	RTE 15	VT5000001230	0.00	RTE	1999-11-18	No info from state

HARDWICK RECYCLING & SALVAGE

EPA ID	ADDRESS	SUBSTANCE	QUANTITY	UNITS	DATE	DESCRIPTION
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000005471	0.00	RTE	1994-09-10	No info from state
VTP000005471	RTE 15 W	VTP000006223	0.00	OVE	1994-09-10	No info from state

HAYES SERVICE STATION

EPA ID	ADDRESS	SUBSTANCE	QUANTITY	UNITS	DATE	DESCRIPTION
VTP000002730	ROUTE 16	VTP000003166	0.00	ROU	1994-09-01	No info from state

HOUSE OF PIZZA

EPA ID	ADDRESS	SUBSTANCE	QUANTITY	UNITS	DATE	DESCRIPTION
VTP000007814	RTE 15	VTP000008295	0.00	HIG	1997-08-02	No info from state
VTP000007814	RTE 15	VTP000007814	0.00	RTE	1997-08-14	No info from state

SUNOCO

EPA ID	ADDRESS	SUBSTANCE	QUANTITY	UNITS	DATE	DESCRIPTION
VTP000003166	ROUTE 15	VTP000005471	0.00	RTE	1996-05-06	No info from state

A maximum of 20 records are shown for each RCRA Manifest generator. More than 20 may exist for those sites.

Photo 1: Kwik Stop & Deli Inc

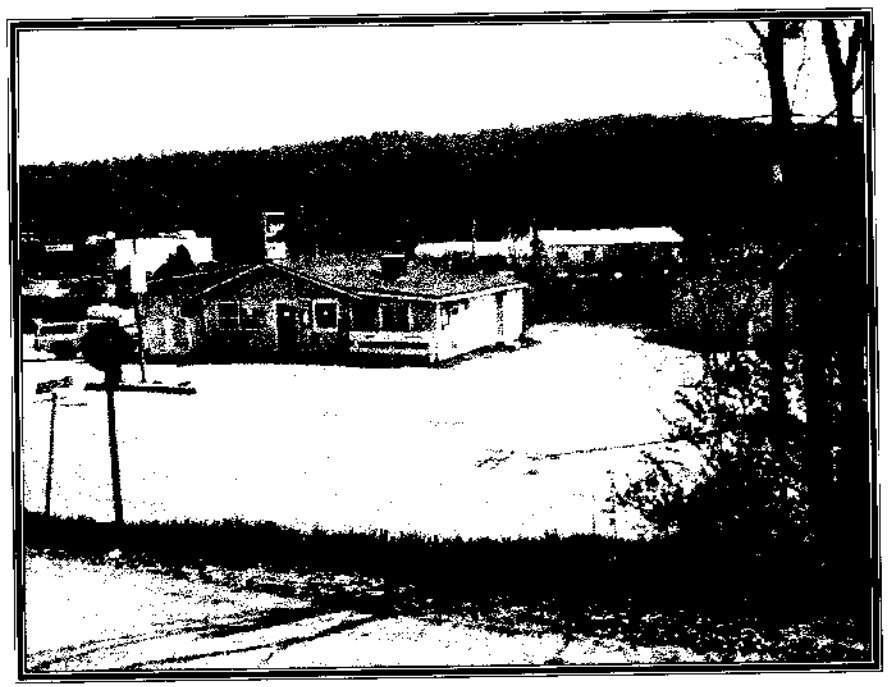


Photo 2: Facing toward the east/northeast (note topography)

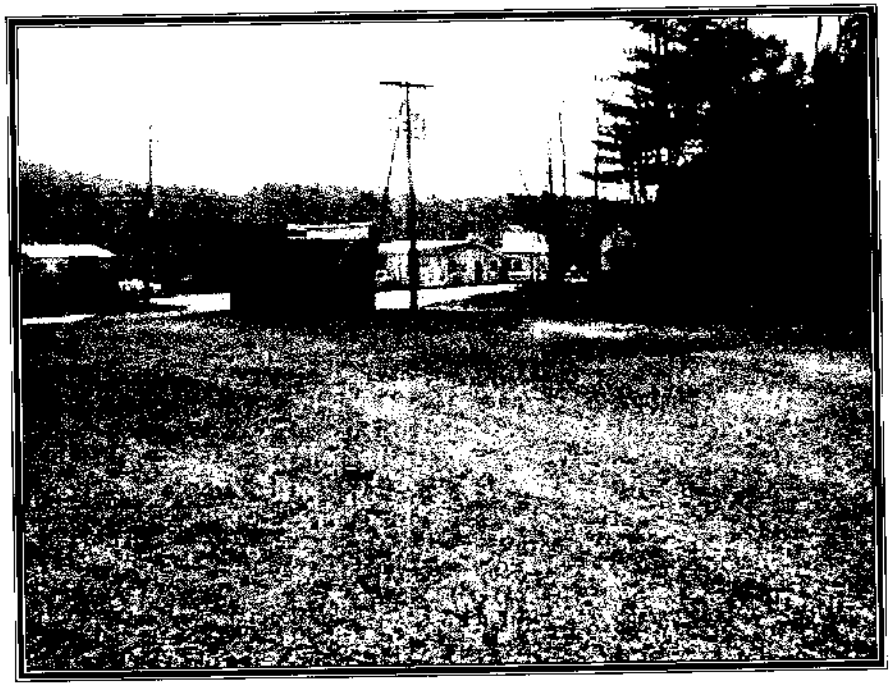


Photo 3: Town Water Supply Well

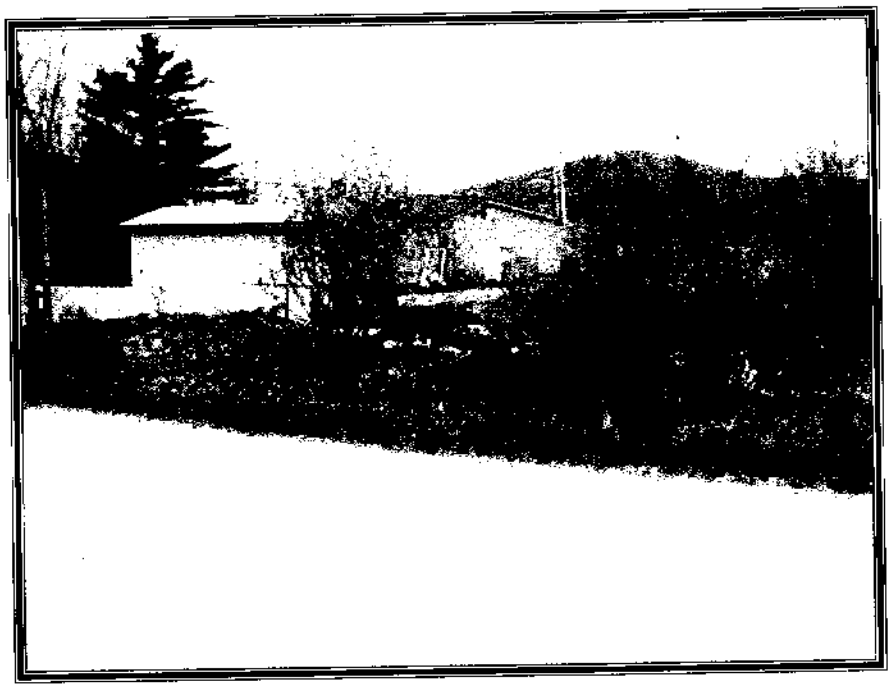


Photo 4: Wet drainage area on eastern side of property

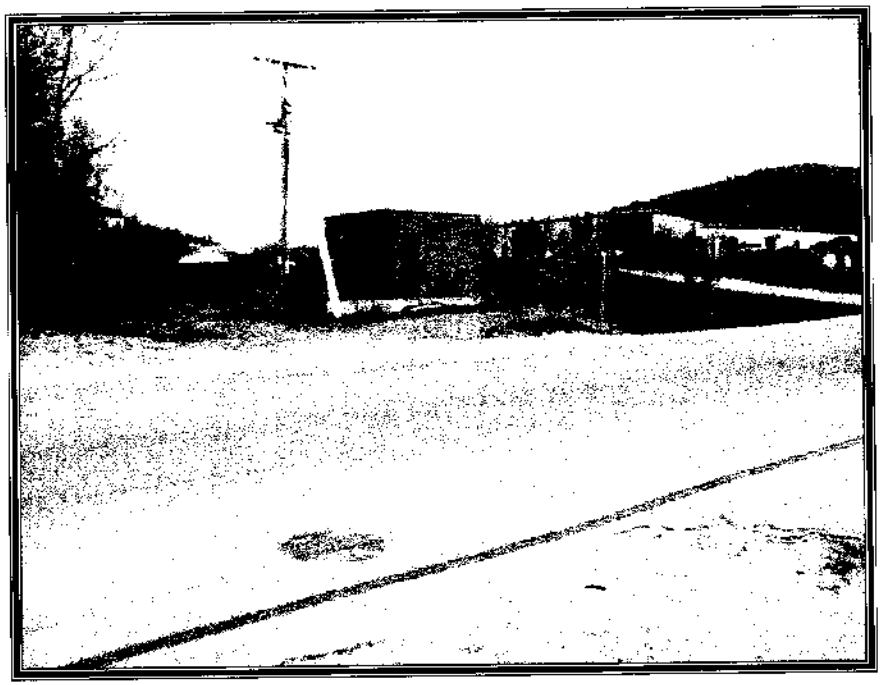


Photo 5: Town Water Supply Well (from Kwik Stop property)

Photo 6: Former and current UST locations (north side of property), Merchants Bank information booth in background

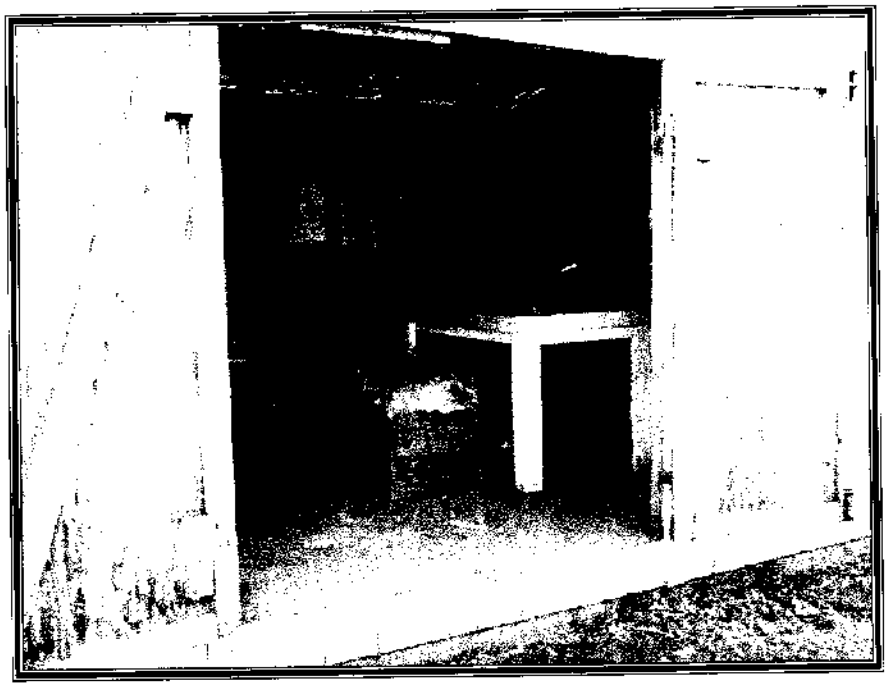


Photo 7: Storage shed

Photo 8: Garbage/Debris behind shed

Photo 9: Retail area inside store

Photo 10: Same as above

Photo 11: Deli area

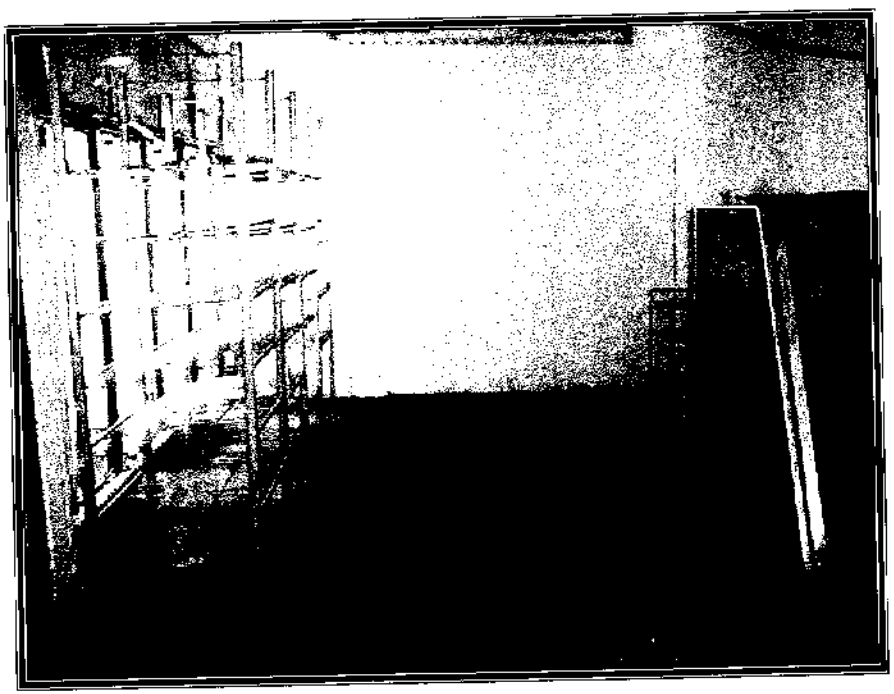


Photo 12: Freezer

APPENDIX 4
TALBE OF CONTENTS

File Kwik Stop

merchants BANK

May 21, 2001

Ruth Schwartz
Union Bank
Wolcott Street
Hardwick, VT 05843

Ref: Buried Fuel Tanks

It has come to my attention that Union Bank has now taken possession of the Kwik Stop property located in Hardwick Vermont. This letter is to inform you that the previous owner of the Kwik Stop was responsible for an abandoned 6,000 gallon gasoline UST (underground storage tank) on property belonging to Merchants Bank. There are also vent pipes, a propane tank and treatment shed on Merchants Bank's property that were installed by the Kwik Stop. I have attached an engineering report identifying the items of concern.

At this time, I would like to understand what action Union Bank will be taking to remove these items prior to selling this asset. Our believe is these items should be cleared up prior to the next owner taking possession of the property.

Please contact me at 802-865-1903 or e-mail me at gdean@mbvt.com

Sincerely,

Gary W. Dean
Facilities Manager

cc: Mary Jane Fradette

Enclosure

BELL ENGINEERING
CIVIL & ENVIRONMENTAL

Memorandum

DATE: April 12, 1999

TO: Andrew Cay, Cay Consulting Company, Inc.

FROM: Ronald K. Bell, PE, Bell Engineering

RE: Encroachments on the Merchants Bank Property, Hardwick, VT

Dear Andy,

On March 23, 1999 I inspected the Merchants Bank Property in Hardwick, VT to determine the purpose of the shed that is located on the Merchants Bank property. The shed is a small shed that housed a groundwater treatment system. The groundwater treatment system has been decommissioned and removed from the shed. A review of the files at the VT State Hazardous Materials Division revealed that there was a release of gasoline from an underground storage tank owned by the abutting Gulf Service Station (the Kwik Stop). The leak was detected when the tanks were replaced in 1984. The contamination that occurred from the leaking underground storage tank (UST) was partially on the Merchants Bank property. The site was cleaned up to acceptable levels and it appears that only continued groundwater quality monitoring is required. Attached is summary of site investigation work and remediation that was conducted at the Kwik Stop site.

When the new tanks were installed in 1984, a 6,000 gallon gasoline UST was located entirely on the Merchants Bank property. In addition to the gasoline UST, encroachments on the Merchants Bank property include a propane tank, a foundation for a sign, 3 vent pipes for the gasoline UST's, the former groundwater treatment shed, and a driveway. The encroachments have been sketched on the property survey map presented in Figure 1. The gasoline UST's are not currently in use - there are no pumps at the Kwik Stop.

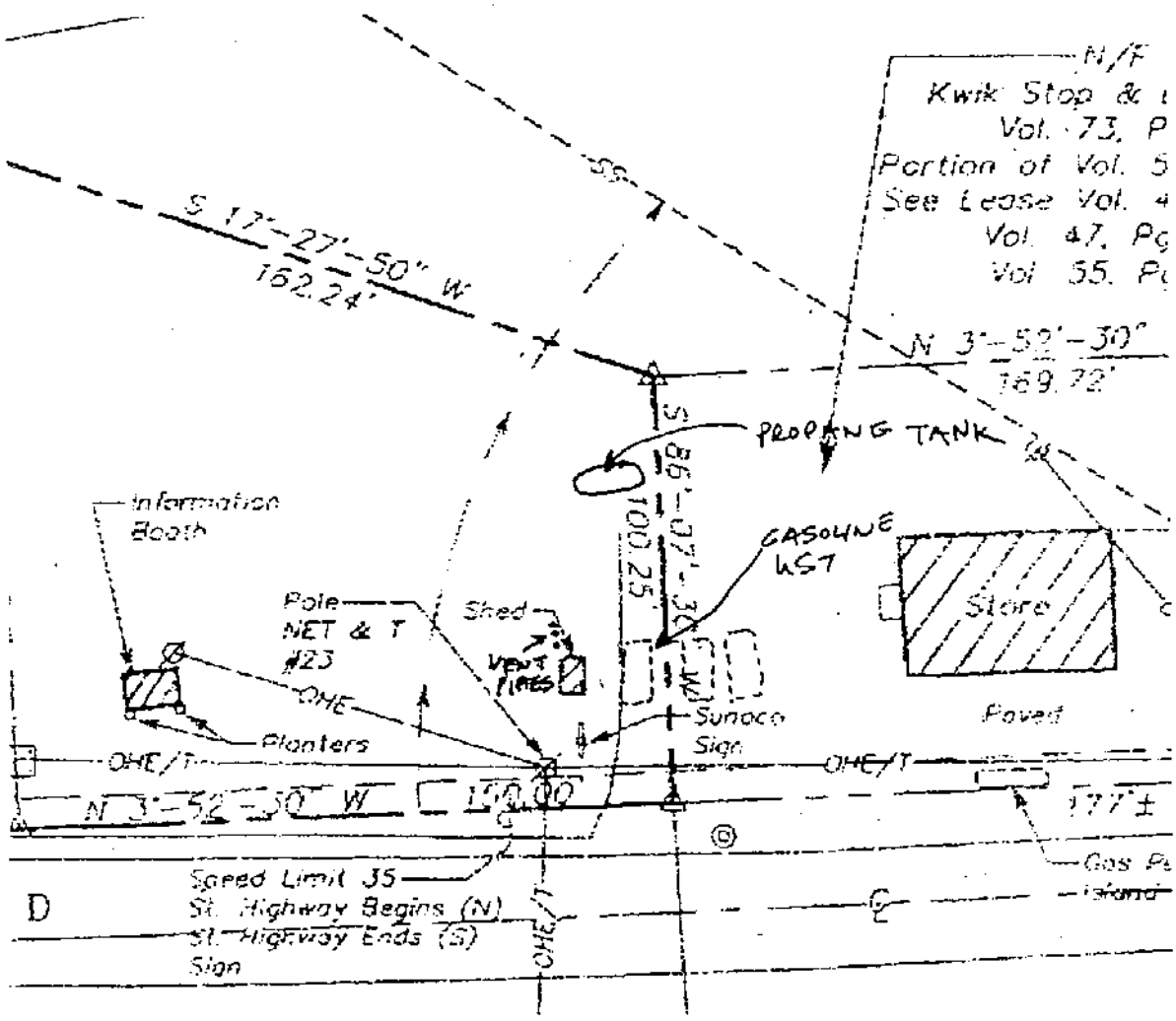
If there is any other information you may need don't hesitate to contact me.

Sincerely,

Ron Bell

Ronald K. Bell, PE

72 School St. PO Box 1805, Keene, New Hampshire 03431 Tel./Fax: (603) 355-3392



THE MERCHANTS BANK
HARDWICK, VT

FIGURE 1: SITE SKETCH

BELL ENGINEERING
CIVIL & ENVIRONMENTAL
72 School St. Keene, NH 03431

State of Vermont

870082

AGENCY OF ENVIRONMENTAL CONSERVATION

103 South Main Stree
Waterbury, Vermont 0567
Department of Water Resource
and
Environmental Engineering

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Water Resources & Environmental Engineering
Natural Resources Conservation Council
State Geologist

September 30, 1986

David Simmons
R & L Kwik Stop and Deli
Route 15
Hardwick Vermont, 05843

RE: Petroleum Contamination of Groundwater

Dear Mr. Simmons:

On September 8, 1986, gasoline contamination of groundwater and soils was discovered on your property while excavation was being performed for the installation of a new underground storage tank. The contamination consists of gasoline vapor in the sandy fill and a sheen of product on the ground water. The Agency believes that the contamination was caused by leaking underground gasoline storage tanks that were replaced in 1984. The product on the ground water could potentially affect the Town of Hardwick's water supply which is located approximately 60 feet away. On September 8, 1986, the Vermont Department of Health sampled the public well for gasoline contaminants. The results showed no evidence of the compounds found in gasoline.

The Secretary of the Agency of Environmental Conservation has concluded that the migration of this waste gasoline (which is classified as a hazardous waste) may present an imminent and substantial danger to the environment. He has concluded that it is necessary to take appropriate interim actions to minimize the immediate impact of such releases to the public health and the environment. 10 VSA, Section 1283 provides, however, that before expending State funds to do the mitigation referred to above, the Agency may provide parties who are potentially responsible for the threat to the environment with an opportunity to voluntarily perform the necessary actions under the direction of the Agency of Environmental Conservation.

The State hereby gives notice that it believes Mr. Simmons is a responsible party under 10 V.S.A. Section 1283. The Secretary has concluded that the following actions are necessary

to mitigate the situation:

1. A consultant with experience in petroleum clean up must be hired to perform the technical work, see attachment for a list of consultants that the Agency works with frequently. This list is by no means complete.

2. An investigation to determine the areal and vertical degree of contamination must be conducted. This will determine the type of remediation system that will be needed.

3. If found to be neccessary by AEC, initiate and monitor a remediation program.

4. All plans and proposals prepared by the consultant are to be reviewed and approved by the Agency. The Agency further reserves the right to participate in all on site activities.

Please advise this office, in writing, within ten (10) days of receipt of this notice as to whether you intend to complete the work described above voluntarily. If you decline to do so, the Secretary may expend State funds to have the work done. If he does so, he will move, pursuant to 10 V.S.A. Section 1283, to have Mr. Simmons reimburse the State of Vermont for the costs of mitigation described above.

If you agree to perform the work described above, you are requested to initiate these actions within ten (10) days of receipt of this letter. Failure to initiate these actions by this date will result in the expenditure of State funds to have this work done.

Sincerely,

John A. Malter

John A. Malter, Director
Waste Management Division

JAM:SJL:cmc

cc: Roger Heath
Ken Banister
Hardwick Board of Selectman

enc.

QUALIFIED CONSULTANTS
For Site Investigation and Remedial Work
April 1986

1. Groundwater Technology; Albany, NY; (518) 456-2444
   Cliff Harper

2. Aquatec, Inc.; Burlington, VT; 658-1074 Roger Binkerd

3. Johnson Company; Montpelier, VT; 229-5976 Martin Johnson

4. Dufresne-Henry; Montpelier, VT; 223-6353 Don Marsh

5. New England Marine Contractors; Williston, VT 879-8800
   Charlie Peterson

6. IEA; Essex Jct., VT; 878-5138 Cathy Cutting

7. Wagner, Heindel and Noyes; Burlington, VT; 658-0820
   Craig Heindel or jeff Noyes

8. Detox, Inc.; P. O. Box 4735, Ithaca, NY 14852;
   (607) 533-7130 Kevin Sullivan

9. IEP, Inc.; 6 Maple St, P. O. Box 780, Northborough, MA 01532;
   (617) 393-8558 or (617) 890-2130 Walter Mulica

State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

Montpelier, Vermont 05602
Department of Water Resources
and
Environmental Engineering

October 15, 1986

Ray Pecor Jr.
Lake Champlain Ferry Lines
King Street Dock
Burlington, VT 05401

RE: Petroleum Contamination of Groundwater

Dear Mr. Pecor:

On September 8, 1986, gasoline contamination of groundwater and soils was discovered on your property while excavation was being performed for the installation of a new underground storage tank. The contamination consists of gasoline vapor in the sandy fill and a sheen of product on the ground water. The Agency believes that the contamination was caused by leaking underground gasoline storage tanks that were replaced in 1984. The product on the ground water could potentially affect the Town of Hardwick's water supply which is located approximately 60 feet away. On September 8, 1986, the Vermont Department of Health sampled the public well for gasoline contaminants. The results showed no evidence of the compounds found in gasoline.

The Secretary of the Agency of Environmental Conservation has concluded that the migration of this waste gasoline (which is classified as a hazardous waste) may present an imminent and substantial danger to the environment. He has concluded that it is necessary to take appropriate interim actions to minimize the immediate impact of such releases to the public health and the environment. 10 VSA, Section 1283 provides, however, that before expending State funds to do the mitigation referred to above, the Agency may provide parties who are potentially responsible for the threat to the environment with an opportunity to voluntarily perform the necessary actions under the direction of the Agency of Environmental Conservation.

The State hereby gives notice that it believes Mr. Pecor is a responsible party under 10 V.S.A. Section 1283. The Secretary has concluded that the following actions are necessary to

mitigate the situation:

1. A consultant with experience in petroleum clean up must be hired to perform the technical work, see attachment for a list of consultants that the Agency works with frequently. This list is by no means complete.

2. An investigation to determine the areal and vertical degree of contamination must be conducted. This will determine the type of remediation system that will be needed.

3. If found to be necessary by AEC, initiate and monitor a remediation program.

4. All plans and proposals prepared by the consultant are to be reviewed and approved by the Agency. The Agency further reserves the right to participate in all on site activities.

Please advise this office, in writing, within ten (10) days of receipt of this notice as to whether you intend to complete the work described above voluntarily. If you decline to do so, the Secretary may expend State funds to have the work done. If he does so, he will move, pursuant to 10 V.S.A. Section 1283, to have Mr. Pecor reimburse the State of Vermont for the costs of mitigation described above.

If you agree to perform the work described above, you are requested to initiate these actions within ten (10) days of receipt of this letter. Failure to initiate these actions by this date will result in the expenditure of State funds to have this work done.

Sincerely,

John A. Malter, Director
Waste Management Division

JAM:SJL:cmc

cc: Roger Heath
David Simmons
Ken Banister
Hardwick Board of Selectman

enc.

QUALIFIED CONSULTANTS
For Site Investigation and Remedial Work
April 1986

1. Groundwater Technology; Albany, NY; (518) 456-2444
   Cliff Harper

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5. New England Marine Contractors; Williston, VT 879-8800
   Charlie Peterson

6. IEA; Essex Jct., VT; 878-5138 Cathy Cutting

7. Wagner, Heindel and Noyes; Burlington, VT; 658-0820
   Craig Heindel or jeff Noyes

8. Detox, Inc.; P. O. Box 4735, Ithaca, NY 14852;
   (607) 533-7130 Kevin Sullivan

9. IEP, Inc.; 6 Maple St, P. O. Box 780, Northborough, MA 01532;
   (617) 393-8558 or (617) 890-2130 Walter Mulica

4-10

MEMORANDUM

TO: Reginald LaRosa, Chief of Operations

THRU: John A. Malter, Director, Waste Management

FROM: Cedric R. Sanborn, Chief, ERMS

RE: Kwik Stop - Hardwick

DATE: March 23, 1987

Anne Whiteley is of the opinion that we need to generate some additional evidence in order to make our case against Pecor & Heath. It is our opinion that the contamination in the ground is the result of leaking tanks that were replaced in 1984. At that time Pecor was the owner and Heath the operator. In order to conclusively determine that the tanks presently in use are not leaking we would need to have tightness tests done. I feel that the Agency should pay for these tests since the tests will be used to build a better case against Pecor & Heath.

Prior to this testing we should perhaps take the evidence we have and the bills, and meet with Pecor & Heath to see if they will voluntarily pay both the costs to date and any future costs.

If they refuse we are then in the position of needing the additional information so that we can put together a referral package for the Attorney General. As you are aware, it can be quite time consuming to generate a referral package. I think a meeting with the PRP's would be more productive. Pecor has expressed an interest in sitting down with us and the other PRP's to discuss payment. Pecor has been willing to pay a percentage of the investigation costs, and has been content to let the Agency handle the investigation.

If we proceed with the testing I would like to use contingency fund money to pay for the tests.

CRS:cmc

cc: Anne Whitely
Chuck Schwer

who owns it now
what will addit info cost
what will tightness cost
How much are clean-up costs
How have we paid them to date
What's the mesh with
6615 -17

State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

103 South Main Street
Waterbury, Vermont 05676
Department of Water Resources
and
Environmental Engineering

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Water Resources & Environmental Engineering
Natural Resources Conservation Council
State Geologist

MEMORANDUM

Fr ~~To:~~ Reginald A. LaRosa, Chief of Operations

THRU: Cedric R. Sanborn, Chief, ERM Section
John F. Amadon, Technical Support Group

To ~~FROM:~~ Steven J. LaRosa, Technical Support Group

RE: Money for Hardwick Investigation

DATE: November 26, 1986

The main objective of this investigation is to determine the potential of the petroleum contamination found near the town well to migrate towards and contaminate the town water supply.

The investigation will consist of the installation of five monitor wells about the site. These wells will be sampled at least twice to determine the degree, extent and movement contamination. The wells will also be used to determine ground water contours. This will give us the necessary data to determine the risk of potential well contamination.

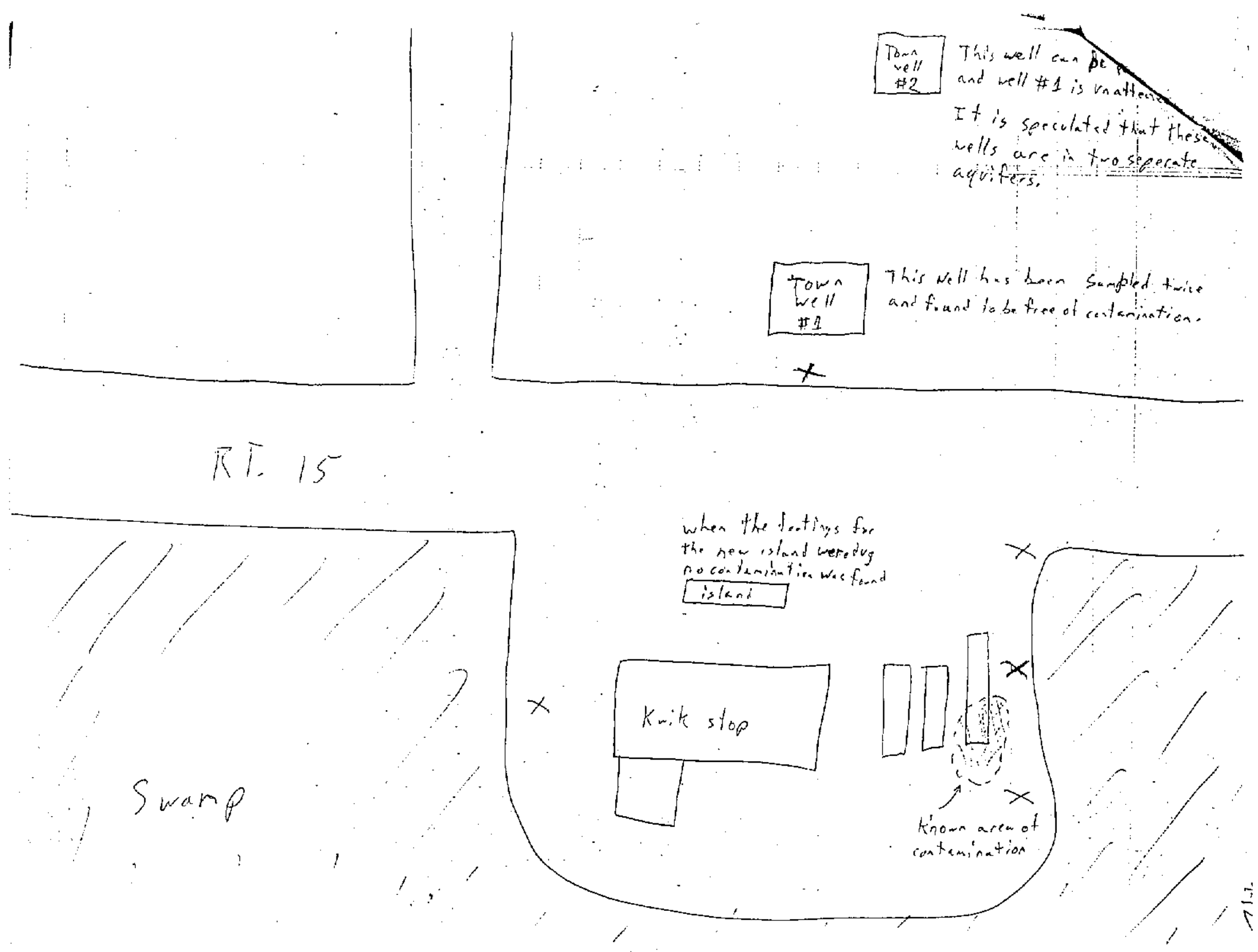
The data collected while installing the monitor wells, such as soil samples, along with the previously mentioned data will determine what, if any, remediation is necessary.

The estimated cost for installation of the wells is $2,500. Any soil or water quality analysis will be performed by the Water Resources Lab. The rest of the data will be collected by the divisions field personnel. The Facilities division will be incorperated for the surveying work necessary. Report of recommendations will be available three weeks after initiation of work.

SJL:CRS:cmc

Enc.

This is ok provided PRP has been notified be 10 VSA 1283 and The fact is recorded RAZ see Attached RAZ


Town well #2
This well can be
and well #1 is unaffected
It is speculated that these wells are in two seperate aquifers.
Town well #1
This well has been sampled twice and found to be free of contamination.
RT. 15
when the testings for the new island were dug no contamination was found
island
Kwik stop
Swamp
known area of contamination

State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

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Waterbury, Vermont 05676
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and
Environmental Engineering

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Water Resources & Environmental Engineering
Natural Resources Conservation Council
State Geologist

MEMO

TO: Reginald A. LaRosa, Chief of Operations, Water Resources Dept.

FROM: Steven J. LaRosa, Environmental Release Management Section

RE: Hardwick Kwik Stop Site

DATE: November 26, 1986

As persuant to 10 VSA 1283, letters were sent to Ray Pecor, Jr., previous owner; Roger Heath, previous leasee and previous land owner; and David Simmons, present land owner.

Mr. Heath and Mr. Simmons declined the opportunity to perform any clean-up of the site. Mr. Pecor has accepted partial responsibility and has agreed to pay part of the costs of remediation. However, he would prefer that the State conduct the investigaton and bill him for the work.

SJL:kp

State of Vermont

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Department of Forests, Parks and Recreation
Department of Water Resources & Environmen...
Natural Resources Conservation Council
State Geologist

MEMORANDUM

TO: John F. Amadon

FROM: Steven J. LaRosa

RE: A & L Kwik Stop Hardwick

DATE: September 24, 1986

On September 8, I went to the R & L Kwik Stop on Route 15 Hardwick to supervise the installation of a new 6000 gallon tank. Work had been stopped on site by request of the Health Department. Ken Banister arrived on site and it was determined that I would supervise the tank installation and Ken would sample the town water wells which could have been affected.

Contamination was found at the ground water level. The products odor was that of old gasoline. Upon investigation it was found that the existing tanks were installed in 1984 replacing two leakers. In the process of excavation a limited amount of contaminated ground water had to be pumped. This water was recharged into a hole adjacent to the new tank hole. This action was approved by Cedric Sanborn and Ken Banister before it was performed.

The tank was installed around 6:00 p.m. The contaminated soils were moved to Bellavance's gravel pit and stored on and covered by plastic. The amount of soils stockpiled totals ~ 150 yards.

A 1283 order has been issued to both the present and former owners of the Kwik Stop.

SJL:cmc

(82) 4-19

MEMORANDUM

TO: John F. Amadon and File 82, Environmental Release

FROM: Steven J. Larosa, Environmental Release Management

RE: Hardwick Kwik Stop

DATE: December 22, 1986

Seeing as how I am bidding my fairwell for a while and as per your request, here is an update on the afore-mentioned site. As of December 19,1986, two groundwater contour maps have been made. Both show that the groundwater flows steeply away from the town well. They also show a ridge resembling a meander scar leading from the town well down through the most highly contaminated area. Although the lab results on the soil and water quality have not been given to us yet, I believe that the extent of contamination will be minimal. This assumption is based on the PID data from soil samples collected while monitor wells were installed.

The results of this investigation prove that the potential for the town well to become contaminated with petroleum is highly unlikely. This conclusion should be checked with the lab results. Quarterly sampling of the wells should continue for as long as feasible or until deemed unnecessary.

SJL:kp

State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION

103 South Main Street
Waterbury, Vermont 05676
Department of Water Resources
and
Environmental Engineering

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Water Resources & Environmental Engineering
Natural Resources Conservation Council
State Geologist

MEMORANDUM

TO: Denise Johnson

THRU: Anne Whitely
John Malter

FROM: Cedric Sanborn

RE: Reimbursement to Contingency Fund

DATE: December 29, 1986

On September 8, 1986 gasoline contamination of soils and groundwater was discovered at the Hardwick Kwik Stop and Deli during the installation of an additional underground storage tank. Based on observations by representatives of this Agency is believed that the contamination was not due to recent leakage. It was determined that two new tanks were installed in December 1984, as a result of one of the tanks taking in water. Also during removal operations in December 1984, several other abandoned tanks were discovered at the site. Unfortunately the site is immediately across the road from Hardwick municipal wells.

Now comes the confusing part. The current owner of the property is David Simmons. Mr. Simmons believes that he is also the owner of the existing tanks. Simmons bought the property from Roger Heath in August of 1985. Heath in turn bought the property in April 1985 from Ray Pecor Jr. who had owned the property since the early 1970's. From 1977 to April 1985, Pecor leased the land and presumably the tanks to Heath.

Heath apparently paid to have new tanks installed in December 1984. This was apparently done without Pecors knowledge. However Heath denies that he owned the new tanks, he claims that he paid the installation costs, and Robinsons

Inc. paid for the tanks. Robinson claims that they do not and have never owned any of the tanks. If all of the above is true then who did Simmons buy the new tanks from.

In any event, the contamination is directly across the road from the Hardwick municipal wells. Due to all of the above confusion about who is responsible, 1283 letters were sent to Pecor, Heath and Simmons. Only Pecor was willing to pay a percentage of the investigatory and possible remediation costs. Pecor preferred that the State do the work and then bill him accordingly. Therefore the Agency went ahead and expended contingency fund money to conduct an investigation. Final costs will be between $2000 and $3000.

Remediation does not appear to be necessary since the groundwater flow is towards the river, and away from the wells. Additionally the geology of the site should further reduce any chance of the contaminants migrating towards the wells.

Based on all of the above, we feel that Ray Pecor Jr., and Roger Health are the two responsible parties and that they should be liable for the Agency costs. Pecor should be liable as the land owner at the time of the leak, and apparent owner of the original tanks. Heath should be liable, since he was the operator of the tanks, and apparent owner of any product in the tanks. It does not appear that Pecor collected any additional fees from use of the tanks by Heath. Heath denies that he owned the product, and claims that Robinson Inc. owned the product. Robinson Inc. denies owning the product.

Any way its all very confusing and I'm in hopes that the AG's office can sort through the material, and proceed with reimbursement proceedings from the responsible parties (whom ever they are).

As an aside we have not pursued Simmons as a responsible party since it appears that he bought the property eight months after the new tanks had been installed and the old ones removed.

CRS:cmc

Summary of Hardwick Water Supply/Kwik Stop Investigation

January 1987

Waste Management Division

Department of Water Resources

and Environmental Engineering

Executive Summary

Petroleum contamination from leaking underground storage tanks poses a potential threat to the Hardwick town water supply. The Department of Water Resources and Environmental Engineering has completed an initial investigation of the area using state contingency funds. The results of this investigation has led the Department to believe the Hardwick water supply has not been and will not be impacted by the petroleum contamination. Groundwater flow direction and tight organic soils in the area of contamination should prevent petroleum migration toward the well. The Department recommends continued monitoring and surveillance of the site to ensure proper protection of the evironment and public health for the town of Hardwick.

Introduction

Groundwater contamination from leaking underground petroleum storage tanks poses a potential threat to the water supply of the town of Hardwick. The State of Vermont through the Department of Water Resources and Environmental Engineering has done an initial investigation of the contamination incident. The following is a summary of the current findings.

Background

In October, 1984 two underground petroleum storage tanks at the Gulf service station (Kwik Stop) in Hardwick, Vermont were believed to be leaking. In November, 1984 the two tanks were replaced. During that time, the property and tanks were owned by Ray C. Pecor, and leased to Roger Heath. The petroleum distributor was Robinson Fuel, which took over from the Augsbury Corporation in 1982. The new tanks were replaced by Wyman's petroleum Equipment, and paid for by Roger Heath. In April, 1985 Roger Heath purchased the property from Ray Pecor, and in August 1985 sold the property and business to Valerie Hussey and David Simmons. In August, 1986 Robinson Fuel sold the businesses account to W.A. Sandri, Inc.

On September 8-9, 1986 during installation of a 6,000 gallon underground storage tank, product contamination was discovered at the groundwater interface. Approximately 150 yards of petroleum contaminated soil was removed and stockpiled under polyethylene sheeting at the Bellevance's gravel pit. During the excavation three abandoned storage tanks were discovered and removed.

On September 30, 1986 an order under 10 V.S.A. Section 1283 was sent to David Simmons, Ray Pecor and Roger Heath requesting voluntary funding for site investigation and clean-up. David Simmons and Roger Heath declined to fund the clean-up, while Ray Pecor accepted partial responsibility. Mr. Pecor has agreed to pay for part of the costs of investigation/remediation carried out by the State.

The State provided funds for the site investigation using contingency funds. On December 3-4, 1986 Adams Engineering installed five monitoring wells around the site (Figure 1), under the guidance of John Amadon, and Steve LaRosa of the Waste Management Division. After one month of site investigation the Technical Support Group of the Waste Management Division has made the following conclusions and recommendations.

Conclusions

Town Water Supply

The Department has collected six separate samples from the town water supply, five from the pump nearest to the contamination, and one from the pump farthest away from the contamination. Five of the samples showed no contamination within the detection limits of EPA Methods 601 and 602 for volatile organic compounds (Table 1). The sample collected from the town well pump on December 11, 1986 did show concentrations of benzene, toluene, ethylbenzene and xylene (BTEX). These constituents are known components of gasoline. However, the Department believes this sample was not representative due to lack of well purging and possible outside contamination. Immediate resampling of the well on two separate occasions did not reveal any detectable contamination.

Monitoring Well Groundwater Samples

Two sets of samples have been collected and analyzed from the monitoring wells (Table 2). December 11, 1986 samples showed concentrations expected of BTEX constituents, but also showed unexpected concentrations of chlorinated hydrocarbons. Again, the Department believes these samples were contaminated from outside sources. The results of these samples show monitoring wells 4 and 5 were in areas of contamination, while wells 1, 2 and 3 were virtually free of BTEX constituents. Groundwater samples collected on January 6, 1987 showed no sign of contamination from chlorinated hydrocarbons, confirming suspicions that the 12/11/86 sample results were anomalous for the Method 601 constituents. For both the January and December sampling, monitoring well 4 showed highest concentrations of BTEX constituents (Method 602), and monitoring wells 1, 2, and 3 were virtually clean. One of the duplicate samples from monitoring well 2 did show 2 ppb benzene, however the other sample was clean. Monitoring well 5 had too little water to sample.

Geology and Hydrogeology

The site is located in the Lamoile River Valley and consists of glaciofluvial deposits overlying the highly metamorphosed schists, phylites, and limited limestone, typical of the Vermont piedmont region. Review of available aerial photos indicates the presence of meander scars from the river with one observed between the existing municipal water supply and the Kwik Stop site where petroleum product was released. This was also confirmed in the drilling records of the town wells.

This observation is corroborated by the soil boring logs (Appendix I) where MW2 showed gravel, cobbles, and fine medium sand from the 5 split spoon samples taken. The log for MW2 was similar to these for the municipal wells but different from the other 4 monitoring wells which appear to be on the easterly side of the meander scar and closer to the current course of the river. Split spoon samples from borings for MW1, 3, 4, and 5 all showed multi layers of silts and peat not seen in the boring for MW2.

On six separate occasions the groundwater elevations were measured and mapped. On all occasions the groundwater flow paths were in a south easterly to easterly direction, which is away from the town well (Figures 2a-2d). The groundwater gradient between MW2 and MW4 has averaged .065 ft/ft. Coupled with the groundwater flow direction and gradient, we believe the organic peat and silts, having a high adsorption potential, will tie up the petroleum, thus preventing migration toward the town well.

Soil Sampling During Monitoring Well Installations

Soil samples were collected for headspace analysis by the Water Resource lab during well installation of MW3, 4, and 5. Soils over the area ranged from gray fine medium sand, to gray fine sandy silt to silty fine sand to black and brown peat to brown gravel. A copy of the soil logs and monitor well construction details is presented in Appendix I. Soil samples were obtained using split spoon techniques and then selectively subsampled for headspace analysis for gasoline constituents. The results of the headspace analysis followed the pattern of the groundwater samples. Monitoring well 3 soils showed no signs of contamination within the detection limits of method 602 analysis (Table 3). Soils from monitoring well 5 were moderately contaminated, while soils from monitoring well 4 were highly contaminated. The pH of the samples varied, and there was no correlation between pH and BTEX concentrations.

Analysis of Stockpiled Soils

The petroleum contaminated soils removed during the September 8-9, 1986 excavation were sampled on November 20, 1986 for headspace analysis. The concentrations of BTEX constituents measured at 5 different locations in the pile varied considerably, from high contamination to no contamination (Table 4). There was no correlation between Ph and BTEX concentrations. An evaluation of the stockpile will be performed in the early spring, 1987 to determine the ultimate disposal location for the soils. It is anticipated that the soils will be suitable for use

at a certified landfill per the Department's protocol for petroleum contaminated soils.

Recommendations

1) Perform a pump test during normal drawdown of the town well to see if monitoring well 2 and 4 are affected. Water samples will be collected periodically during the pump test to evaluate product migration.

2) Collect and analyze another set of groundwater samples from monitoring wells in February.

3) Initiate a monthly sampling and analysis of the municipal water supply.

4) Leave the stockpiled soils through the winter, and reevaluate in the spring before ultimate disposal to a landfill facility.

5) Investigate possible remediation alternatives which could be used effectively, both in terms of cost and effectiveness, to remediate site if town well becomes impacted.

6) Initiate recoupment of the Department's cost from the responsible parties as detailed in Section 1283 of 10 V.S.A.

CBS:cmc

Table 1: Results of Town Well Sampling

date	results		
	town well 1		
10/20/86	method 601	-	0
	method 602	-	0
	town well 1		
12/11/86	method 601	-	0
	method 602	-	unknown peaks also found
	benzene	-	27 ppb
	toluene	-	68 ppb
	ethylbenzene	-	4 ppb
	total xylene	-	26 ppb
	town well 1		
1/02/87	method 601	-	0
	method 602	-	0
	town well 2		
	method 601	-	0
	method 602	-	0
	town well 1		
1/06/87	method 601	-	0
	method 602	-	0
	town well 1		
	method 601	-	0
	method 602	-	0

Table 2: Results from monitoring well groundwater samples

12/11/86

Well	Results			
MW1	601	-	1,1-dichloroethane	3 ppb
			trichloroethane	24 ppb
	602	-	0	
MW2a	601	-	Trans-1,2-dichloroethene	3 ppb
			1,1,1-Trichloroethane	6 ppb
	602	-	ethylbenzene	1 ppb
MW2b	601	-	chloroform	7 ppb
			trichloroethane	1 ppb
	602	-	0	
MW3	601	-	0	
	602	-	0	
MW4a	601	-	unknown peaks also found	
			dichloroethene	0 ppb
			trans-1,2-dichlorethane	520 ppb
			1,2-dichloroethane	2200 ppb
			1,1,1-trichloroethane	11,820 ppb
			bromodichlorethane	14,590 ppb
			trichloroethene	5,655 ppb
	602	-	unknown peaks also found	
			benzene	14,800 ppb
			toluene	34,500 ppb
			ethylbenzene	2,500 ppb
			total xylenes	16,400 ppb
MW4b	601	-	unknown peaks also found	
			1,1-dichloroethene	124 ppb
			trans-1,2-dichlorethane	160 ppb
			1,2-dichloroethane	1,280 ppb
			1,1,1-trichloroethane	7,410 ppb
			bromodichloroethane	5,520 ppb
			trichloroethene	2,173 ppb
			tetrachloroethane	790 ppb
	602	-	benzene	14,300 ppb
			toluene	33,600 ppb
			ethylbenzene	2,400 ppb
			total xylenes	16,600 ppb

Table 2 - continued

MW5	601 -	1,1-dichloroethane	1 ppb
		1,1,1-trichloroethane	16 ppb
	602 -	unknown peaks also found	
		benzene	18 ppb
		toluene	18 ppb
		ethylbenzene	6 ppb
		total xylenes	31 ppb

1/6/87

well	results		
MW1	601 -	0	
	602 -	0	
MW2a	601 -	0	
	602 -	benzene	2 ppb
MW2b	601 -	0	
	602 -	0	
MW3	601 -	0	
	602 -	0	
MW4a	601 -	0	
	602 -	unknown peaks also found	
		benzene	20,000 ppb
		toluene	42,000 ppb
		ethylbenzene	27,000 ppb
		total xylenes	20,900 ppb
MW4b	601 -	0	
	602 -	unknown peaks also found	
		benzene	22,000 ppb
		toluene	42,000 ppb
		ethylene	2,300 ppb
		total xylenes	22,700 ppb
MW5	not enough water to sample		

: Results from soils from monitoring well installations

soil texture	pH	Benzene (ppb)	Toluene (ppb)	E.Benz. (ppb)	Xylenes (ppb)	ene pb)	Total BTE (ppb)
v. fine grey sand	2.10	0	0	0	0	0	0
v. fine grey sand	2.47	0	0	0	0	0	0
fine grey sand	2.16	0	0	0	0	0	0
fine grey sand	2.28	0	0	0	0	0	0
fine grey sand	1.17	0	0	0	0	3	1,394
gravel	2.31	0	0	0	0	5	110
						)	70
						)	5
						)	0
						)	0
						)	0
						)	328
soil texture	pH	Benzene (ppb)	Toluene (ppb)	E.Benz. (ppb)	Xylenes (ppb)		2,211
							847
coarse sand/gravel	3.04	94,333	26,666	17,333	299		37,017
fine sand & organic	2.85	16,667	15,333	1,733	10,800		0
fine sand & organic	2.98	786	1,643	714	6,785		0
peat	2.07	1,333	83	0	0		0
peat & silt	2.54	45,517	35,517	11,724	82,068		0
peat & silt	2.32	143	48	48	96		0
							0
							0
							19
soil texture	pH	Benzene (ppb)	Toluene (ppb)	E.Benz. (ppb)	Xylenes (ppb)		157
							22
							19
coarse sand	4.84	0	0	0	0		19
peat	2.97	1,824	529	118	705		19
peat	2.60	947	526	0	211		30
silt	3.02	2,067	933	67	198		

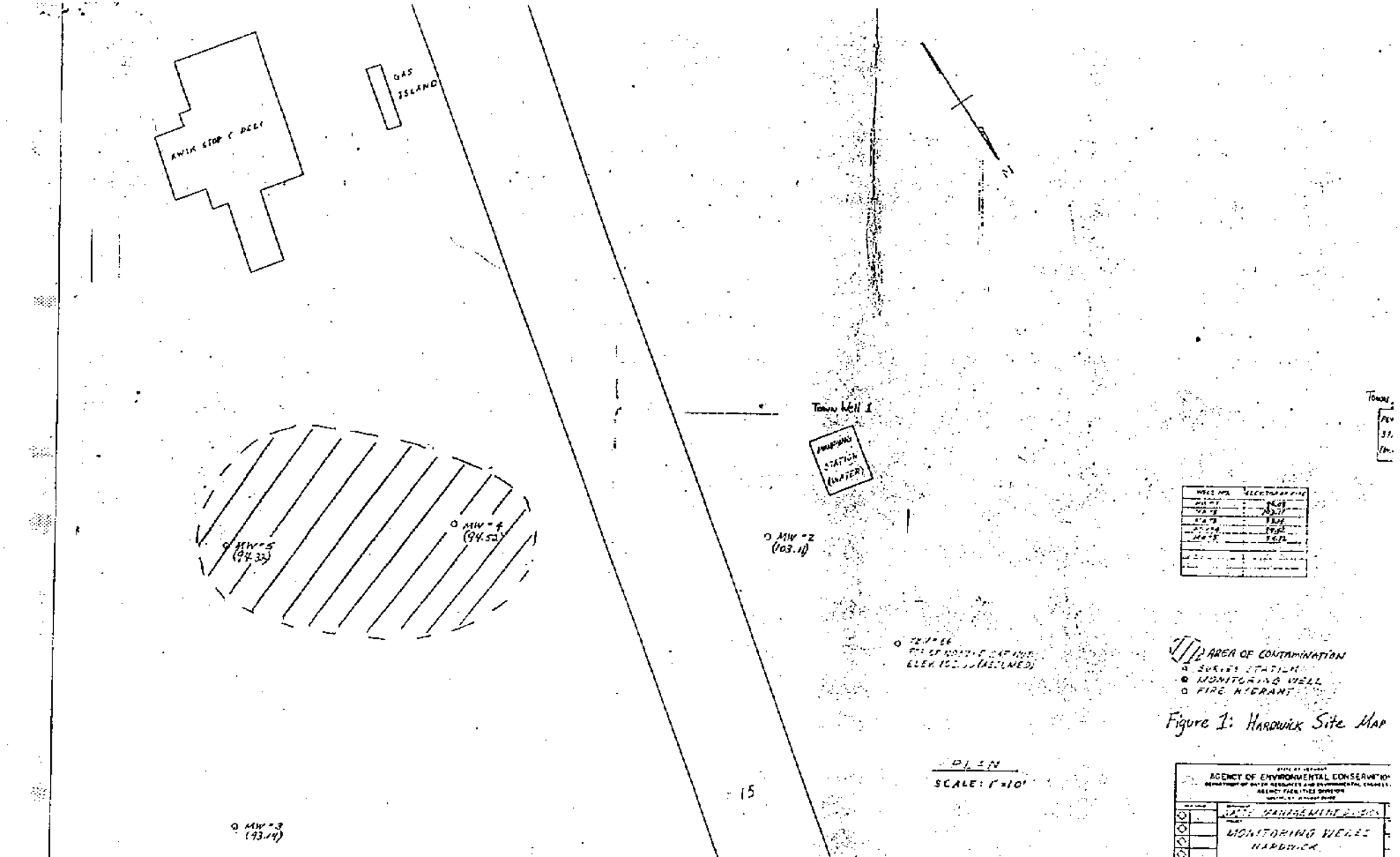

Figure 1: Hardwick Site Map

AGENCY OF ENVIRONMENTAL CONSERVATION

MONITORING WELLS
HARDWICK

4-28

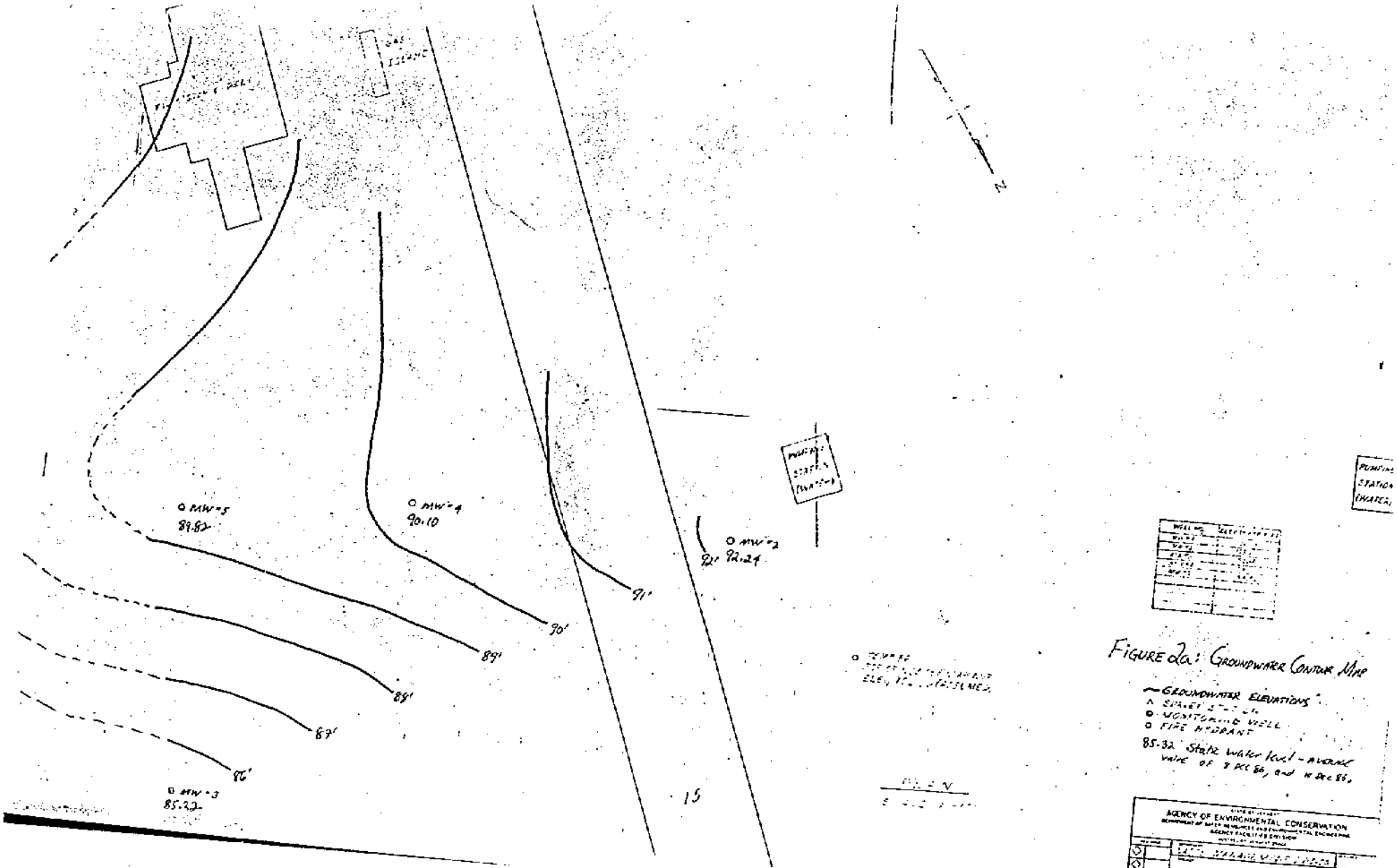

FIGURE 2a: GROUNDWATER CONTOUR MAP

— GROUNDWATER ELEVATIONS*
△ STREET SIGN
□ MONITORING WELL
○ FIRE HYDRANT
85-32 *STATE WATER LEVEL - AVERAGE VALUE OF 3 DEC 85, 2nd & 4th DEC 85.

AGENCY OF ENVIRONMENTAL CONSERVATION

MONITORING WELL HAZARDS

Figure 2b: Groundwater Contour Map

FIGURE 2C: GROUNDWATER CONTOUR MAP

4-31

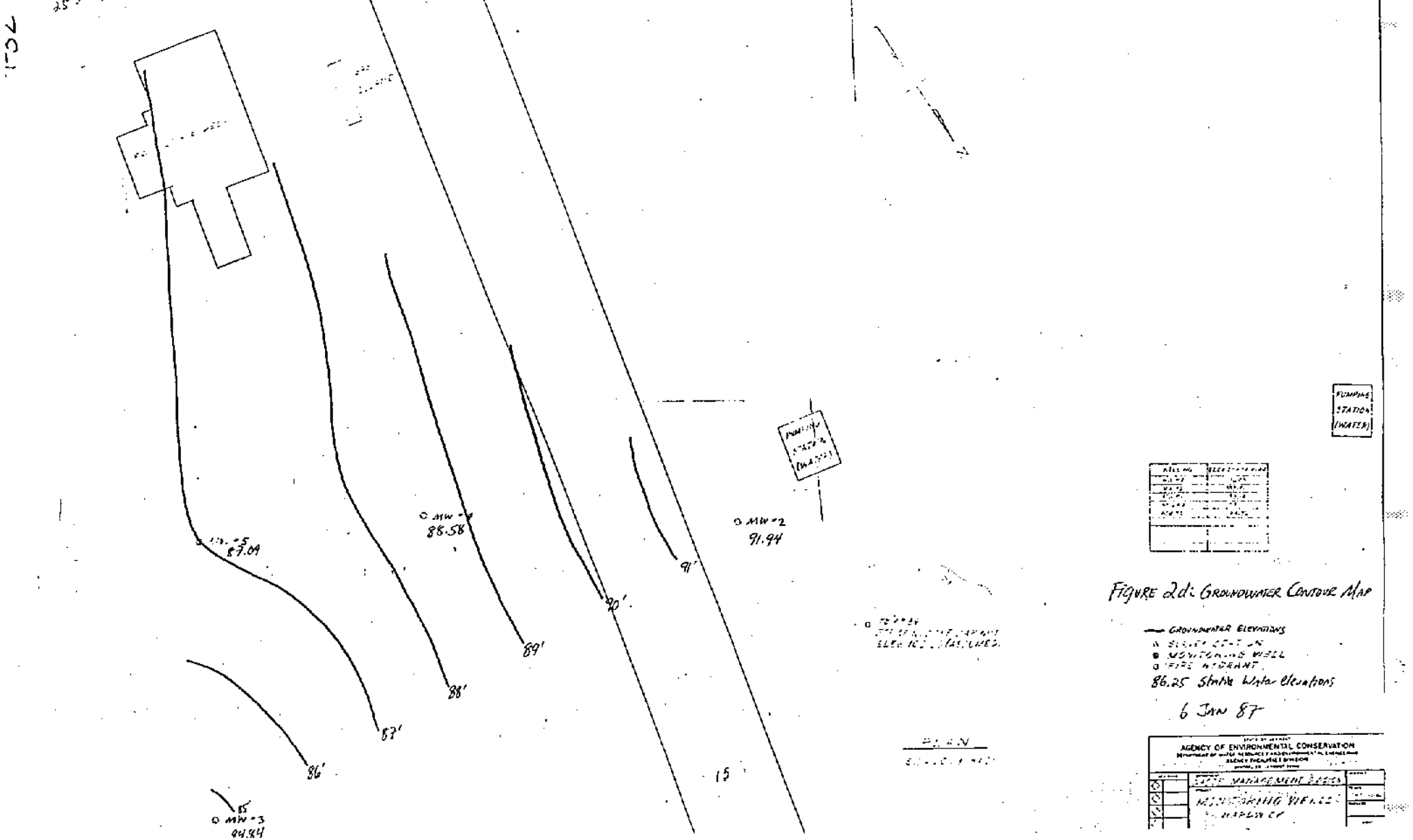

FIGURE 2d: GROUNDWATER CONTOUR MAP

— GROUNDWATER ELEVATIONS
○ SELECTED LOCATION
● MONITORING WELL
□ FIRE HYDRANT
86.25 Static Water Elevations

6 JAN 87

AGENCY OF ENVIRONMENTAL CONSERVATION

STATE MANAGEMENT AREAS

MONITORING WELLS

ADAMS ENGINEERING
Gerard Adams
RD #1, Box #403
Underhill, Vt. 05489
899-4945

December 6, 1986

Mr. John Amadon
Agency of Enviornmental Conservation
Hazardous Waste Section
#103 South Main St.
Waterbury, Vt. 05676

Dear John

The following are the boring logs for Kwick Stop/Hardwick project conducted under your direction representing the AEC:

12/3/86 TB/MW #1 SE Corner of travelled area.
0-5' Brown sand fill water at 5.0'.
-7.0' 3,1,2,2. (blows from a #140 hammer falling 30" to drive a standard penetration sampler 6" -blow counts are not intended for load bearing information, ie; emphasis is on sample recovery) Brown sand over organic silt over a gray silt.
-12.5' 1,5,9,12. Gray fine sandy silt over brown medium sand.
-17.6' 9,2,11,5. Silty dark brown gravel.

MONITOR WELL
2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 5'cut Bags Sand:7 .49 mm
Sand Pack To below grade:-1 '
15# of granular betonite at 1'.
Screened from -4.0' To -13.5' Stickup: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #2 At Pump House.
-6.5' 19,21,25. Gravel & cobbles.
-12.2' 8,10,12,13. Gray over brown gravel. water at 8'.
-14.6' 6,13,12,8. Redish brown gravel.
-16.4' 6,4,4,4. Same over clean light gray fine medium sand.*
-19.8' 4,7,13. Same over brown gravel.

MONITOR WELL
2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 10' Bags Sand:3 .49 mm
Sand Pack To below grade:-1.5'
30# of granular betonite at 1.5'.
Screened from -7.3' To -16.8' Stickup: +3.8'
Deloped by flushing followed by air pumping: Clear Flow: Good
* Plowing sand & collapsing gravel required washing to instal well & resulted significant collapse.

12/4/86 TB/MW #3 Bank prop. to NE.
0-5' Brown sandy fill, water 2.7'
-7.1' 4,6,9,10. Saturated brown sand over gray fine sandy silt.

-11.8' 1,2,5,6. Dark brown silty fine sand.
-15.1' 2,4,3,4. Gray fine sand over dar brown silty gravel.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 2' Bags Sand:6 .49 mm
Sand Pack To below grade:-1' Betonite Plug: 5# of 3/8 NS at 13'
15# of granular betonite at -1'.
Screened from -2.3 To -11.8' Stick up: +.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #4 Sunoco Sign.
0-5' Brown sand fill water at 4.3' Mells of gasoline.
-7.3' 6,2,3,3. Brown sand & gravel over black peat.
-9.8' 3,4,6,8. Dark brown peat over gray silt.
-12.7' 5,3,3,6. Gray silt trace finew sand.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 5' Solid Riser: 5' Cut Bags Sand:4 .49 mm
Sand Pack To below grade:- 3'
20# of granular betonite at3'
Screened from -3.6' To -8.1' Stick up: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #5 NE Corner of travelled area. Augers cleaned before use.
0-5' Sand & gravel fill, water at -4.'
-6.8' 2,1,1,3. Saturated brown sand.
-9.6' 4,5,4,6. Lenses of gray fine sandy silt and silty fine sand and black peat.
-11.0' 4,1,3. Same more silt.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 5' Solid Riser: 5' cut Bags Sand:4 .49 mm
Sand Pack To below grade:-2'.
20 # of granular betonite at -1.5'.
Screened from -2.8' To -7.3' Stickup: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

Gerard Adams

0700 82

HARDWICK WATER SUPPLY/KWIK STOP INVESTIGATION

ANNUAL REPORT: 1987

HAZARDOUS MATERIALS MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

EXECUTIVE SUMMARY

Petroleum contamination from a leaking underground storage tank exists in an area adjacent to the Hardwick town water supply. The Hardwick Kwik Stop and Deli has been determined to be the source of the contamination. The amount of product released and the time the leak began is unknown. The Department of Environmental Conservation identified the contamination in September, 1986. A site investigation was completed by the Department, with recommendations to provide monthly monitoring of the town water supply and surrounding area. The results of this monitoring has shown no adverse impact from the contamination to the town well. Contamination still exists in an area adjacent to the well. The Department recommends continued monthly monitoring combined with the implementation of a small-scale ground water treatment system.

INTRODUCTION

In September, 1986 petroleum contamination was identified at the Hardwick Kwik Stop and Deli. The contamination poses a threat to the water supply of the town of Hardwick. The State of Vermont through the Department of Environmental Conservation has completed a site investigation, which includes one (1) year of groundwater monitoring. The following is a summary of the current findings.

BACKGROUND

In October, 1984 two underground petroleum storage tanks at the Gulf service station (Kwik Stop) in Hardwick, Vermont were believed to be leaking. In November, 1984 the two tanks were replaced. During that time, the property and tanks were owned by Ray C. Pecor, and leased to Roger Heath. The petroleum distributor was Robinson Fuel, which took over from the Augsbury Corporation in 1982. The new tanks were replaced by Wyman's Petroleum Equipment, and paid for by Roger Heath. In April, 1985 Roger Heath sold the property and business to Valerie Hussey and David Simmons. In August, 1986 Robinson Fuel sold the businesses account to W.A. Sandri, Inc.

On September 8-9, 1986 during insallation of a 6,000 gallon underground storage tank, product contamination was discovered at the groundwater interface. Approximately 150 yards of petroleum contaminated soil was removed and stockpiled under polyethylene sheeting at the Bellevance's gravel pit. During the excavation three abandoned storage tanks were discovered and removed.

On September 30, 1986 an order under 10 V.S.A. Section 1283 was sent to David Simmons, Ray Pecor and Roger Heath requesting voluntary funding for site investigation and clean-up. Ray Pecor accepted partial responsibility and has agreed to pay for part of the costs of the investigation and remediation carried out by the State.

The State provided funds for the site investigation using contingency funds. On December 3-4, 1986 Adams Engineering installed five monitoring wells around the site (Figure 1), under the guidance of John Amadon, and Steve LaRosa of the Department of Envrionmental Conservation.

GEOLOGY AND HYDROGEOLOGY

The site is located in the Lamoille River Valley and consists of glaciofluvial deposits overlying the highly metamorphosed schistis, phylites, and limited limestone,

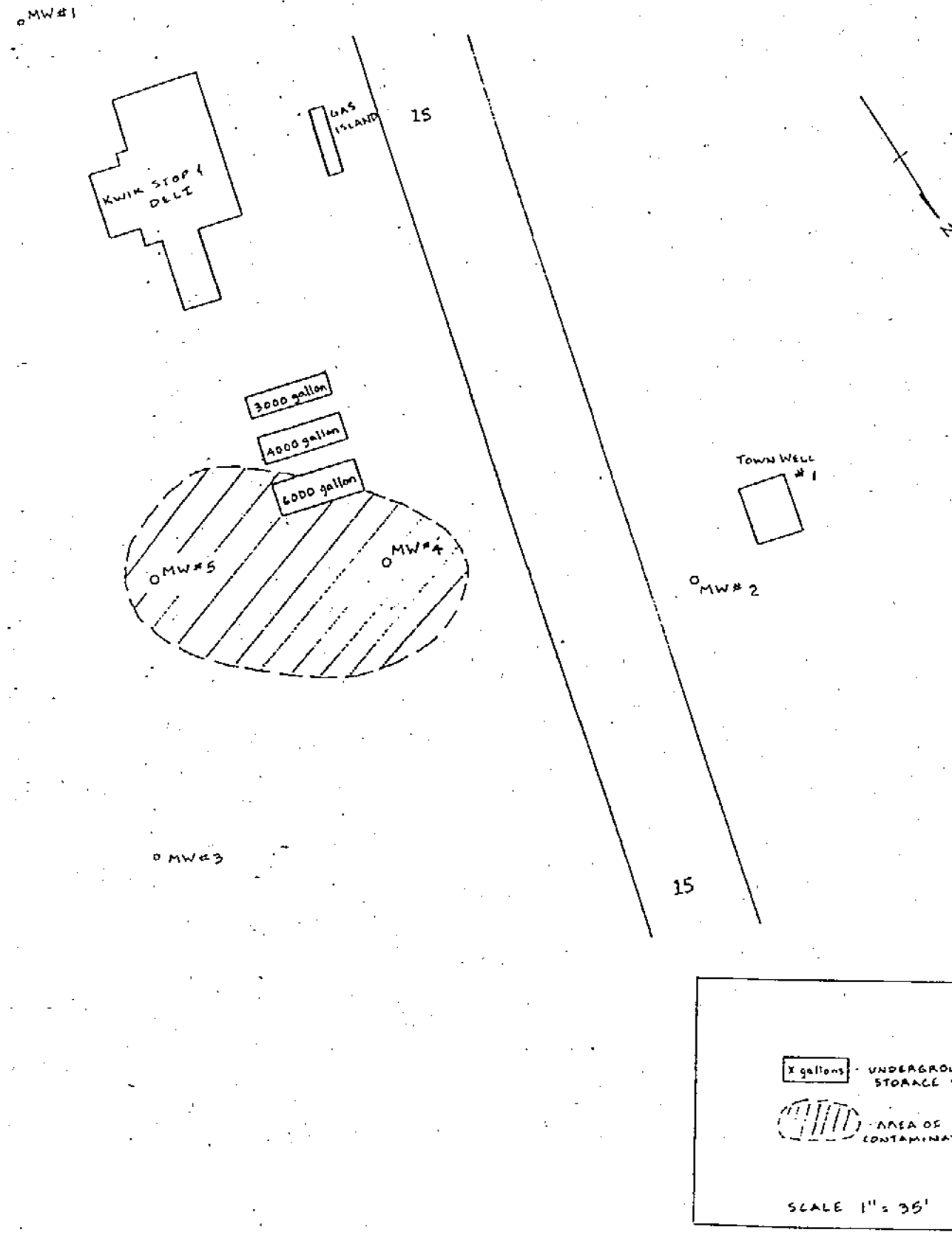

Figure 1: Hardwick Kwik Stop Site Map

typical of the Vermont piedmont region. Review of available aerial photos indicates the presence of meander scars from the river with one observed between the existing municipal water supply and the Kwik Stop site where petroleum product was released. This was also confirmed in the drilling records of the town wells.

This observation is corroborated by the soil boring logs (Appendix I) where MW2 showed gravel, cobbles, and fine medium sand from the 5 split spoon samples taken. The log for MW2 was similar to these for the municipal wells but different from the other 4 monitoring wells which appear to be on the easterly side of the meander scar and closer to the current course of the river. Split spoon samples from borings for MW1, 3, 4, and 5 all showed multi layers of silts and peat not seen in the boring for MW2 or the town well.

On thirteen separate occasions the groundwater elevations were measured and mapped. On all occasions the groundwater flow path was in a south easterly to easterly direction which is away from the town well (Figure 2).

Groundwater elevations were measured on February 5, 1987, during the pumping of the town well to determine its influence on the contaminated area. MW #2, closest to the town well, responded the most to the pumping. After 8 1/2 minutes of pumping, the well showed 1 1/2" of drawdown. After 100 minutes of pumping, the well showed an additional 4 1/2" of drawdown. During the last 38 minutes there was no change in the water table elevation in well #2. Well #4 showed a slight decrease in elevation after pumping. After 137.5 minutes the elevation decreased by 1/2". The elevations in wells 3 & 5 remained unchanged over the pump test period. The hydraulic gradient between the town well and the area of contamination is steep enough that the drawdown measured in well #2 and #4 is not great enough to reverse the flow of groundwater.

SOIL SAMPLING DURING MONITORING WELL INSTALLATION

Soil samples were collected for headspace analysis by the Water Resource lab during well installation of MW3, 4, and 5. Soils over the area included gray fine medium sand, gray fine sandy silt, silty fine sand, black and brown peat and brown gravel. A copy of the soil logs and monitor wells construction details is presented in Appendix I. Soil samples were obtained using split spoon techniques and then selectively sub-sampled for headspace analysis for some specific gasoline constituents. The results of the headspace analysis followed the pattern of the groundwater samples. Monitoring well 3 soils showed no signs of

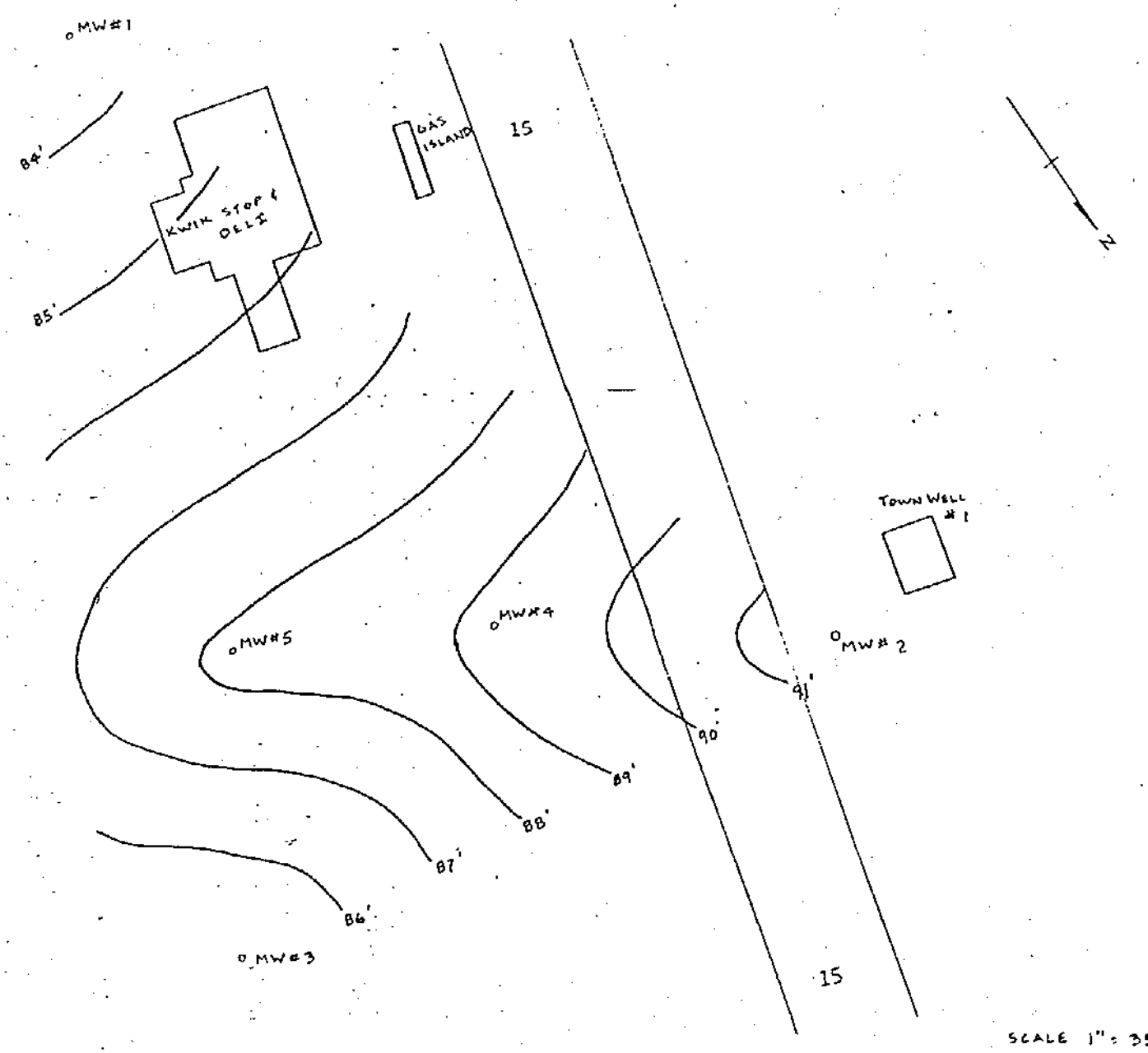

Figure 2: Groundwater elevations measured at Hardwick Kwik Stop site on December 29, 1987

contamination within the detection limits of EPA Method 602 analysis (Table 1). Soils from monitoring well 5 were moderately contaminated, while soils from monitoring well 4 were highly contaminated. The pH of the samples varied, and there was no correlation between pH and BTEX concentrations.

STOCKPILED SOILS

Approximately 150 yards of petroleum-contaminated soils were removed from the Kwik Stop site on September 8-9, 1986, and stockpiled under polyethylene sheeting at the the Bellevance gravel pit. On November 20, 1986 soil samples were collected from the stockpile for laboratory analysis of BTEX concentrations in the headspace using EPA laboratory method 602. The average concentration measured in the pile was 1408 ppb total BTEX with concentrations as high as 15,365 ppb benzene. On May 29, 1987 the pile was resampled and BTEX concentrations were non-detectable for all samples using a HNu photoionization device (PID) and by analysing soil samples in the laboratory (Table 2). Final approval was given to return the soil to the Kwik Stop as fill material behind the store.

TOWN WELL/GROUNDWATER SAMPLNG

On forteen separate occasions the Department has collected and analyzed water samples from the town well. A total of nineteen samples were collected, and in only one sample were any constituents of gasoline detected above Vermont health advisory levels (Table 3). On December 11, 1986 benzene was detected above the health advisory level, however, this was not considered a representative sample because of potential cross-contamination and improper well purging. Concentrations of BTEX were not detected in 17 of the remaining 18 samples collected. A sample obtained on 6/18/87 detected 2 ppb toluene, which is below the Vermont health advisory level of 2000 ppb.

MONITORING WELLS/GROUNDWATER SAMPLING

Analysis of groundwater samples collected from the monitoring wells indicate that there still exists an area of high contamination around MW4, while the other monitors have yielded little to no contamination (Table 4). The concentrations of benzene, toluene, ethlybenzene and xylenes (BTEX) in MW4 have fluctuated over the year monitoring period, with a slight downward trend (Figure 3). Yet, the total BTEX concentrations are still quite high (37,870 ppb). Concentrations of BTEX were not detected in 8 of 9 samples collected from MW1, and 7 of 9 samples collected from MW3.

Table 1: Laboratory results from monitoring well soils

well #3

samp.	depth	soil texture	pH	Benzene (ppb)	Toluene (ppb)	E.Benz. (ppb)	Xylenes (ppb)
3A		very fine grey sand	2.10	0	0	0	0
BB	7.1'	very fine grey sand	2.47	0	0	0	0
3C	11.0'	fine grey sand	2.16	0	0	0	0
3D	15.1'	fine grey sand	2.28	0	0	0	0
3E	15.1'	fine grey sand	1.17	0	0	0	0
3F	15.1'	gravel	2.31	0	0	0	0

well #4

samp.	depth	soil texture	pH	Benzene (ppb)	Toluene (ppb)	E.Benz. (ppb)	Xylenes (ppb)
4A	5'	coarse sand/ gravel	3.04	94,333	26,666	17,333	299
4B	6'	fine sand & organic	2.85	16;667	15,333	1,733	10,800
4C	6'	fine sand & organic	2.98	786	1,643	714	6,785
4D	7'	peat	2.07	1,333	83	0	0
4E	9'	peat & silt	2.54	45,517	35,517	11,724	82,068
4F	9'	peat & silt	2.32	143	48	48	96

well #5

samp.	depth	soil texture	pH	Benzene (ppb)	Toluene (ppb)	E.Benz. (ppb)	Xylenes (ppb)
5A	6'	coarse sand	4.84	0	0	0	0
5B	6.4'	peat	2.97	1,824	529	118	705
5C	6.4'	peat	2.60	947	526	0	211
5D	6.8	silt	3.02	2,067	933	67	198

TABLE 2 - Average concentrations of BTEX measured from petroleum contaminated stockpiled soils.

date sampled	Concentration (mg/kg) benzene	toluene	ethylbenzene	xylenes	t.BTEX
11/20/86 laboratory results	610	228	85	486	1408
# of samples	30	30	30	30	30
5/29/87 laboratory results	*ND	ND	ND	ND	ND
# of samples	18	18	18	18	18

PID results not detected for all 18 samples

*ND = not detected

TABLE 3 - Concentration of benzene, toluene, ethylbenzene and xylenes measured in groundwater samples collected from the town well.

date collected	benzene	toluene	ethylbenzene	xylene
10/20/86	*ND	ND	ND	ND
12/11/86	27	68	4	26
01/02/87	ND	ND	ND	ND
01/06/87	ND	ND	ND	ND
01/06/87	ND	ND	ND	ND
02/05/87	ND	ND	ND	ND
02/05/87	ND	ND	ND	ND
02/05/87	ND	ND	ND	ND
02/05/87	ND	ND	ND	ND
02/18/87	ND	ND	ND	ND
04/07/87	ND	ND	ND	ND
04/07/87	ND	ND	ND	ND
04/30/87	ND	ND	ND	ND
06/18/87	ND	2	ND	ND
08/04/87	ND	ND	ND	ND
09/09/87	ND	ND	ND	ND
10/28/87	ND	ND	ND	ND
11/23/87	ND	ND	ND	ND
12/09/87	ND	ND	ND	ND
Health Adv. Levels	5	2000	1400	620
EPA Method 602 detection limits	1	1	1	1

*ND = not detected

TABLE 4 - Concentrations of benzene, toluene, ethylbenzene and xylenes measured in groundwater samples collected from monitoring wells

monitoring well	date collected	benzene	toluene	ethylbenzene	xylene
1	12/11/86	*ND	ND	ND	ND
1	1/6/87	ND	ND	ND	ND
1	2/18/87	ND	ND	ND	ND
1	4/30/87	ND	ND	ND	ND
1	6/18/87	ND	2	ND	ND
1	8/4/87	ND	ND	ND	ND
1	9/9/87	ND	ND	ND	ND
1	10/28/87	ND	ND	ND	ND
1	12/9/87	ND	ND	ND	ND
2	12/11/86	ND	ND	1	ND
2	1/6/87	2	ND	ND	ND
2	2/18/87	ND	1	ND	3
2	4/30/87	ND	ND	ND	ND
2	6/18/87	ND	2	ND	ND
2	8/4/87	ND	ND	ND	ND
2	9/9/87	ND	ND	ND	ND
2	10/28/87	ND	ND	ND	ND
2	12/9/87	ND	ND	ND	ND
3	12/11/86	ND	ND	ND	ND
3	1/6/87	ND	ND	ND	ND
3	2/18/87	ND	44	3	34
3	4/30/87	ND	ND	ND	ND
3	6/18/87	ND	2	ND	ND
3	8/4/87	ND	ND	ND	ND
3	9/9/87	ND	ND	ND	ND
3	10/28/87	ND	ND	ND	ND
3	12/9/87	ND	ND	ND	ND
4	12/11/86	14,550	34,050	2,450	16,500
4	1/6/87	21,000	42,000	2,500	21,800
4	2/18/87	13,200	21,150	1,080	16,400
4	4/30/87	4,300	23,350	1,200	18,800
4	6/18/87	5,500	24,400	1,200	17,200
4	8/4/87	12,900	77,000	1,680	36,000
4	9/9/87	4,425	19,350	2,250	19,950
4	10/28/87	4,500	16,950	1,500	19,350
4	12/9/87	2,775	12,125	1,420	21,550
5	12/11/86	18	18	6	31
5	4/30/87	5	1	ND	ND
5	6/18/87	16	27	ND	ND
5	8/4/87	7	3	ND	5
5	10/28/87	ND	ND	ND	ND
5	12/9/87	21	ND	ND	ND

*ND = not detected

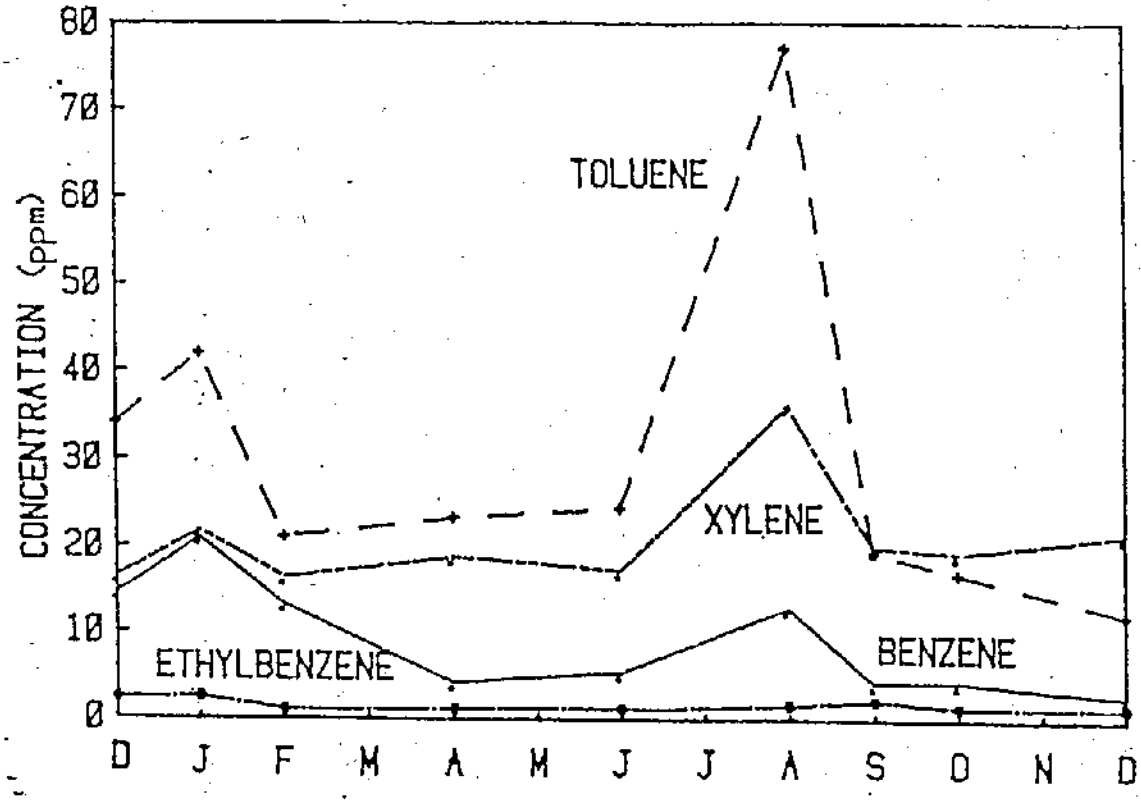

Figure 3: Concentrations of benzene, toluene, ethylbenzene and xylenes in monitoring well 4, Hardwick Kwik Stop

Trace concentrations of BTEX were detected in 4 of 10 samples from MW2, the well located slightly downgradient of the town well. MW5 continued to show moderate BTEX concentrations.

VAPORS IN TOWN WELL BUILDING

On February 5, 1987 gasoline vapors were noted in the town well #1 pump house. On February 9, 1987 the building was assayed for gasoline vapors using a photovac TIP photoionization device, which was calibrated for benzene. Ambient levels on the ground floor were 20-25 ppm. The subsurface floor in the pumping station had levels of 56-58 ppm. All potential conduits were checked for incoming petroleum vapors. Only one source was discovered; the water line and drain pipe that leaves the station and passes through the Kwik Stop property had a faulty concrete seal around it. The PID assays ranged from 200-1000 ppm, on three separate measurements. The seal has been repaired with concrete, and vapor levels have been reduced to non detectable level by PID.

CONCLUSIONS

The town water supply has not been adversely impacted by the petroleum contamination at the Kwik Stop and Deli in Hardwick, Vermont. Contamination still exists in an area close to the well, and degradation has occurred at a slow rate. Trace amounts of benzene, toluene, ethylbenzene and xylenes have been detected in MW2, located very close to the town well.

Hydrocarbon vapors from the contaminated area have migrated into the town well pumphouse through the backfilled material surrounding one water line. A repaired seal has currently solved the vapor problem. Concentrations of BTEX in the stockpiled petroleum-contaminated soil have reached non-detectable levels after 8 months of treatment by polyencapsulation.

RECOMMENDATIONS

The town well should continue to be monitored on a monthly basis to ensure the residents of Hardwick are not exposed to petroleum-contaminated drinking water. The monitoring wells should be monitored every six weeks to determine the changes in groundwater quality over time. A small-scale groundwater treatment system should be installed to help promote a more rapid site remediation. Implementation and monitoring of this system will be coordinated by the Department of Environmental Conservation.

Appendix I

ADAMS ENGINEERING
Gerard Adams
RD #1, Box #403
Underhill, Vt. 05489
899-4945

December 6, 1986

Mr. John Amadon
Agency of Enviornmental Conservation
Hazardous Waste Section
#103 South Main St.
Waterbury, Vt. 05676

Dear John

The following are the boring logs for Kwick Stop/Hardwick project conducted under your direction representing the AEC:

12/3/86 TB/MW #1 SE Corner of travelled area.
0-5' Brown sand fill water at 5.0'.
-7.0' 3,1,2,2. (blows from a #140 hammer falling 30" to drive a standard penetration sampler 6" -blow counts are not intended for load bearing information, ie; emphasis is on sample recovery) Brown sand over organic silt over a gray silt.
-12.5' 1,5,9,12. Gray fine sandy silt over brown medium sand.
-17.6' 9,2,11,5. Silty dark brown gravel.

MONITOR WELL
2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 5'cut Bags Sand:7 .49 mm
Sand Pack To below grade:-1 '
15# of granular betonite at 1'.
Screened from -4.0' To -13.5' Stickup: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #2 At Pump House.
-6.5' 19,21,25. Gravel & cobbles.
-12.2' 8,10,12,13. Gray over brown gravel. water at 8'.
-14.6' 6,13,12,8. Redish brown gravel.
-16.4' 6,4,4,4. Same over clean light gray fine medium sand.*
-19.8' 4,7,13. Same over brown gravel.

MONITOR WELL
2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 10' Bags Sand:3 .49 mm
Sand Pack To below grade:-1.5'
30# of granular betonite at 1.5'.
Screened from -7.3' To -16.8' Stickup: +3.8'
Deloped by flushing followed by air pumping: Clear Flow: Good
* Flowing sand & collapsing gravel required washing to instal well & resulted significant collapse.

12/4/86 TB/MW #3 Bank prop. to NE.
0-5' Brown sandy fill, water 2.7'
-7.1' 4,6,9,10. Saturated brown sand over gray fine sandy silt.

-11.8' 1,2,5,6. Dark brown silty fine sand.
-15.1' 2,4,3,4. Gray fine sand over dar brown silty gravel.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 2' Bags Sand:6 .49 mm
Sand Pack To below grade:-1' Betonite Plug: 5# of 3/8 NS at 13'
15# of granular betonite at -1'.
Screened from -2.3 To -11.8' Stick up: +.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #4 Sunoco Sign.
0-5' Brown sand fill water at 4.3' Mells of gasoline.
-7.3' 6,2,3,3. Brown sand & gravel over black peat.
-9.8' 3,4,6,8. Dark brown peat over gray silt.
-12.7' 5,3,3,6. Gray silt trace finew sand.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 5' Solid Riser: 5' Cut Bags Sand:4 .49 mm
Sand Pack To below grade:- 3'
20# of granular betonite at3'
Screened from -3.6' To -8.1' Stick up: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #5 NE Corner of travelled area. Augers cleaned before use.
0-5' Sand & gravel fill, water at -4.'
-6.8' 2,1,1,3. Saturated brown sand.
-9.6' 4,5,4,6. Lenses of gray fine sandy silt and silty fine sand and black peat.
-11.0' 4,1,3. Same more silt.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 5' Solid Riser: 5' cut Bags Sand:4 .49 mm
Sand Pack To below grade:-2'.
20 # of granular betonite at -1.5'.
Screened from -2.8' To -7.3' Stickup: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

Gerard Adams

Appendix I

ADAMS ENGINEERING
Gerard Adams
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Underhill, Vt. 05489
899-4945

December 6, 1986

Mr. John Amadon
Agency of Enviornmental Conservation
Hazardous Waste Section
#103 South Main St.
Waterbury, Vt. 05676

Dear John

The following are the boring logs for Kwick Stop/Hardwick project conducted under your direction representing the AEC:

12/3/86 TB/MW #1 SE Corner of travelled area.
0-5' Brown sand fill water at 5.0'.
-7.0' 3,1,2,2. (blows from a #140 hammer falling 30" to drive a standard penetration sampler 6" -blow counts are not intended for load bearing information, ie; emphasis is on sample recovery) Brown sand over organic silt over a gray silt.
-12.5' 1,5,9,12. Gray fine sandy silt over brown medium sand.
-17.6' 9,2,11,5. Silty dark brown gravel.

MONITOR WELL
2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 5'cut Bags Sand:7 .49 mm
Sand Pack To below grade:-1 '
15# of granular betonite at 1'.
Screened from -4.0' To -13.5' Stickup: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #2 At Pump House.
-6.5' 19,21,25. Gravel & cobbles.
-12.2' 8,10,12,13. Gray over brown gravel. water at 8'.
-14.6' 6,13,12,8. Redish brown gravel.
-16.4' 6,4,4,4. Same over clean light gray fine medium sand.*
-19.8' 4,7,13. Same over brown gravel.

MONITOR WELL
2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 10' Bags Sand:3 .49 mm
Sand Pack To below grade:-1.5'
30# of granular betonite at 1.5'.
Screened from -7.3' To -16.8' Stickup: +3.8'
Deloped by flushing followed by air pumping: Clear Flow: Good
* Flowing sand & collapsing gravel required washing to instal well & resulted significant collapse.

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0-5' Brown sandy fill, water 2.7'
-7.1' 4,6,9,10. Saturated brown sand over gray fine sandy silt.

-11.8' 1,2,5,6. Dark brown silty fine sand.
-15.1' 2,4,3,4. Gray fine sand over dar brown silty gravel.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 10' Solid Riser: 2' Bags Sand:6 .49 mm
Sand Pack To below grade:-1' Betonite Plug: 5# of 3/8 NS at 13'
15# of granular betonite at -1'.
Screened from -2.3 To -11.8' Stick up: +.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #4 Sunoco Sign.
0-5' Brown sand fill water at 4.3' Mells of gasoline.
-7.3' 6,2,3,3. Brown sand & gravel over black peat.
-9.8' 3,4,6,8. Dark brown peat over gray silt.
-12.7' 5,3,3,6. Gray silt trace finew sand.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 5' Solid Riser: 5' Cut Bags Sand:4 .49 mm
Sand Pack To below grade:- 3'
20# of granular betonite at3'
Screened from -3.6' To -8.1' Stick up: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

TB/MW #5 NE Corner of travelled area. Augers cleaned before use.
0-5' Sand & gravel fill, water at -4.'
-6.8' 2,1,1,3. Saturated brown sand.
-9.6' 4,5,4,6. Lenses of gray fine sandy silt and silty fine sand and black peat.
-11.0' 4,1,3. Same more silt.

MONITOR WELL

2" Factory threaded & Slotted (.020") PVC-Deitrich.
Slotted section: 5' Solid Riser: 5' cut Bags Sand:4 .49 mm
Sand Pack To below grade:-2'.
20 # of granular betonite at -1.5'.
Screened from -2.8' To -7.3' Stickup: -.3'
Deloped by flushing followed by air pumping: Clear Flow: Good

Gerard Adams
Gadams

MEMORANDUM

TO: Cedric Sanborn

FROM: Chuck Schwer CS

DATE: August 22, 1988

RE: Groundwater Treatment System at Hardwick Kwik Stop

In January, 1988, I prepared a report summarizing monitoring results collected in 1987 for the Hardwick Kwik Stop site. In this report, I concluded there still exists contamination in an area close to the Hardwick town water supply. I recommended the implementation of a small-scale groundwater treatment system as a means of reducing the contaminants near the town well. Prior to initiating this task, the monitoring well in the contaminated area was destroyed by a snow plow. On June 27, 1988, the monitoring well was reinstalled in the contaminated area. Samples were collected on July 19, 1988, and contamination was again identified adjacent to the town well. I still recommend installing a groundwater treatment system at this site. Enclosed are estimates for implementing the treatment system at the site. Included in this cost is subcontracting for the electrical work, and the costs of the groundwater pump and fittings, a float level control, and a shed to contain the system. The carbon stored in the compound will be used to treat the groundwater. There will be associated costs to use the laboratory to evaluate the system, and there will be costs for disposal of the used carbon. The system is a simple design and will require little maintenance. Therefore, I believe DEC personnel can set the system up and maintain it at little cost to the state. In the long run, this will alleviate the need for us to continually monitor the town well.

Please let me know if and how we can proceed with this proposal.

CBS/mlc#646

enclosure

HARDWICK KWIK STOP RECOVERY SYSTEM

1/3 hp Meyers Jet Pump	$188.00	1		$188.00
Foot Valve (Bronze)	20.00	1		20.00
<u>BW Level Control</u>				
- control (220V)	135.10	1		135.10
- electronics	12.00	2		24.00 ←
- suspension wire	.20/ft	60'	@ .20	12.00
Hose (influent and effluent)				20.00
Electrical Service				850.00
Heat Tape	1.00/ft			35.00
Heat Tape Connectors (kits)	5.00	2		10.00
Equipment Shed/Insulated	500.00	1		500.00
Duct Tape, Clamps, other assorted items	75.00			75.00
Light Fixture	3.60			3.60
Wire (electrical)	25.00	1		25.00
Fixture Mounting Box	5.00			5.00
Misc.				121.40
Total				2000.00

MEMORANDUM

TO: Brian Kooiker

THRU: Cedric Sanborn

FROM: Chuck Schwer

DATE: September 28, 1988

RE: Request for Discharge Order to Treat Petroleum-Contaminated Soils in Hardwick

---

Petroleum contamination exists near the town well in Hardwick, Vermont. The Department has inherited the site because the responsible party is not clearly known. The site has been investigated and monitored for the past 1 1/2 years. Enclosed is a copy of a report summarizing the Department's findings. At this point, we feel a small-scale groundwater treatment system would be more effective than a lengthy monitoring program. A discharge would be generated from this system, and will need a 1272 discharge order. The system will consist of a groundwater pump and carbon filtration. A pump will be installed in monitoring well #4 downgradient of the town well. The discharge will be between 1 and 2 gpm. The groundwater will pass through two 55 gallon drums of activated carbon placed in series. The discharge from this system will be to an area of standing water behind the Kwik Stop Deli and Gas station, which is away from the town well. The standing water/swamp area was completely dry this summer.

The Department plans on monitoring both influent and effluent on a monthly basis for benzene, toluene, ethylbenzene and xylenes by the state's laboratory. Samples will be collected more frequently in the first few months to ensure proper treatment is being achieved.

Please review this proposal, and the report, and let us know if you will issue the Department a 1272 discharge order. If you need any additional information, please feel free to contact us.

CBS/mlc#790

enclosure

4-55
SUM 7 1 1057

LINCOLN
APPLIED GEOLOGY, INC.
ENVIRONMENTAL CONSULTANTS

June 10, 1992

Mr. Robert Haslam
Hazardous Materials Management
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Hardwick Quick Stop, Hardwick, Vermont - Quarterly Update

Dear Bob:

Lincoln Applied Geology, Inc. (LAG) has continued to implement contract #0963300 to maintain and monitor the remedial system at the Hardwick Quick Stop in Hardwick, Vermont. This letter report is to serve as the second quarterly report. The remedial system has basically remained operational and functional. Some minor difficulties with the flow meter during this quarter have finally been rectified. The treatment system, however, has remained operational with minor pump repairs made on May 8th.

Attached for your information and use are: **Table 1**, Volume of Ground Waters Pumped; **Table 2**, Summary of Total Aromatic Hydrocarbons Since April 1991; and **Appendix A**, Copies of Formal Analytical Results for the May 8, 1992 Sampling.

As you are aware from our discussions earlier this spring, numerous problems related to the flow meter were encountered. With your concurrence we finally replaced the faulty meter this past April 29th..

During the site visits made for those 1992 timeframes delineated in **Table 1**, LAG technical staff performed routine checks to assure that the pumping and treatment system was operational.

The second quarter analytical samples were obtained on May 8, 1992. A summary of quarterly water quality monitoring is provided in **Table 2** with copies of the formal analytical results included in **Appendix A**. The results are very favorable with only 1.7 parts per billion (ppb) toluene detected in the effluent of canister 1. No BTEX constituents were found within the pumped ground water from the recovery well, the final treatment effluent from carbon canister #2, or the Town Well.

RD # 1 Box 710 • Bristol, Vermont 05443 • (802) 453-4384 • FAX (802) 453-5399

We will continue with our biweekly site monitoring in fulfillment of the current contract. If you have any questions or concerns with regard to this matter, please do not hesitate to call me at 802-453-4384.

Sincerely,

John F. Amadon, CPSS

JFA/smd

Enclosures

Lincoln Applied Geology, Inc.
Environmental Consultants
RD # 1 Box 710 • Bristol, Vermont 05443 • (802) 453-4384 • FAX (802) 453-5399

Table 1

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 1 of 1

Volume of Ground Water Pumped

Meter Reading (gal)

8-23-90	9-6-90	9-24-90	10-8-90	10-29-90	11-5-90	11-19-90	11-26-90	12-10-90 [1]
5,778	21,597	31,246	37,902	46,963	52,256	52,264	56,637	66,032

12-26-90 [1]	1-7-91 [2]	1-21-91 [1]	2-11-91	2-25-91	3-11-91 [1]	3-25-91 [2]	4-8-91	4-26-91
66,032	66,064	---	79,307	91,354	96,618	99,629	115,044	

5-9-91	5-20-91	6-3-91	6-17-91	7-1-91	7-15-91	7-30-91	8-16-91	12-12-91
133,509	141,544.0	149,113.0	156,607.0	166,750.0	173,679.0	181,145.5	189,334.0	196,886.0

1-3-92	1-13-92	1-30-92	2-12-92 [3]	2-20-92 [3]	3-1-92 [3]	3-16-92 [3]	4-1-92 [3]	4-14-92 [3]
---	196,886.7	196,886.8	---	---	---	---	---	---

4-24-92 [3]	5-8-92 [4]	5-12-92	5-26-92					
---	2,145.0	4,151.0	11,623.0					

Notes:
1 - System Off
2 - System Restarted
3 - Flow Meter Malfunction
4 - New Meter Installed

Table 2

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 1 of 1

Total Aromatic Hydrocarbons (ppb)

Sample Point	4-26-91	5-20-91	6-17-91	7-1-91	7-30-91	1-13-92	5-8-92	
Infuent	3,398	2,442	1,950	35.78	1,370	1,616	ND	
Canister 1	2,330	1070.00	977	---	425	10.7	1.7	
Effluent	1,150	676.00	877	ND	3.07	12.2	ND	
MW-2	---	ND	---	---	ND	---	---	
MW-4	---	239	---	---	708	---	---	
Town Well	---	ND	---	---	ND	ND	ND	

NOTES: ND = None Detected

APPENDIX A

Formal Analytical Results
For May 8, 1992

4-6

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: May 22, 1992
DATE SAMPLED: May 8, 1992
DATE RECEIVED: May 8, 1992
ANALYSIS DATE: May 17, 1992

PROJECT CODE: LAHA7588
REF.#: 30,678
STATION: Town Well
TIME SAMPLED: 11:30
SAMPLER: James

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:
1 None detected

Reviewed by _____

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

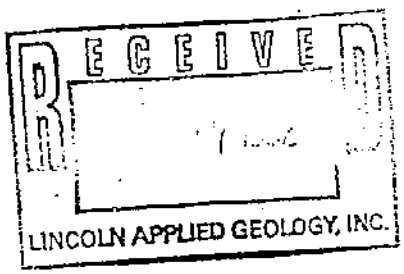
LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: May 22, 1992
DATE SAMPLED: May 8, 1992
DATE RECEIVED: May 8, 1992
ANALYSIS DATE: May 22, 1992

PROJECT CODE: LAHA7588
REF.#: 30,679
STATION: Influent
TIME SAMPLED: 11:30
SAMPLER: James

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	1	ND



NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:
1 None detected

Reviewed by _____

4-6+

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: May 22, 1992
DATE SAMPLED: May 8, 1992
DATE RECEIVED: May 8, 1992
ANALYSIS DATE: May 17, 1992

PROJECT CODE: LAHA7588
REF.#: 30,680
STATION: Effluent Can 1
TIME SAMPLED: 11:30
SAMPLER: James

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	1.7
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 1

NOTES:
1 None detected

Reviewed by _____

4-63

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: May 22, 1992
DATE SAMPLED: May 8, 1992
DATE RECEIVED: May 8, 1992
ANALYSIS DATE: May 18, 1992

PROJECT CODE: LAHA7588
REF.#: 30,681
STATION: Effluent Can 2
TIME SAMPLED: 11:30
SAMPLER: James

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 1

NOTES:
1 None detected

Reviewed by _____

4-64

LINCOLN
APPLIED GEOLOGY, INC.
ENVIRONMENTAL CONSULTANTS

September 15, 1992

Mr. Robert Haslam
Hazardous Materials Management
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Hardwick Quick Stop, Hardwick, Vermont - Quarterly Update

Dear Bob:

Lincoln Applied Geology, Inc. (LAG) has continued to implement contract #0963300 to maintain and monitor the remedial system at the Hardwick Quick Stop in Hardwick, Vermont. This letter report is to serve as the third quarterly report. The remedial system has basically remained operational and functional. In early August, the deteriorated carbon canisters were replaced per your discussions with Steve LaRosa, LAG Site Manager.

Attached for your information and use are: **Table 1**, Volume of Ground Waters Pumped; **Table 2**, Summary of Total Aromatic Hydrocarbons Since April 1991; and **Appendix A**, Copies of Formal Analytical Results for the August 5, 1992 Sampling.

As we discussed by telephone, the Town Well assayed for ethylbenzene at 8.1 ug/l (ppb). No other identified or unidentified peaks were reported. We recommend that additional sampling be performed.

In light of the continued presence of soluble phase contaminants in the ground waters being pumped from the Quick Stop site we also recommend that treatment continue.

We will continue with our biweekly site monitoring in fulfillment of the current contract. Please note that this contract is due to expire at the end of November 1992. If you have any questions or concerns with regard to this matter, please do not hesitate to call me at 802-453-4384.

Sincerely,

JFA/smd
Enclosures

John F. Amadon, CPSS

RD # 1 Box 710 • Bristol, Vermont 05443 • (802) 453-4384 • FAX (802) 453-5399

Table 1

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 1 of 1

Volume of Ground Water Pumped

Meter Reading (gal)

8-23-90	9-6-90	9-24-90	10-8-90	10-29-90	11-5-90	11-19-90	11-26-90	12-10-90 [1]
5,778	21,597	31,246	37,902	46,963	52,256	52,264	56,637	66,032

12-26-90 [1]	1-7-91 [2]	1-21-91 [1]	2-11-91	2-25-91	3-11-91 [1]	3-25-91 [2]	4-8-91	4-26-91
66,032	66,064	---	79,307	91,354	96,618	99,629	115,044	

5-9-91	5-20-91	6-3-91	6-17-91	7-1-91	7-15-91	7-30-91	8-16-91	12-12-91
133,509	141,544.0	149,113.0	156,607.0	166,750.0	173,679.0	181,145.5	189,334.0	196,886.0

1-3-92	1-13-92	1-30-92	2-12-92 [3]	2-20-92 [3]	3-1-92 [3]	3-16-92 [3]	4-1-92 [3]	4-14-92 [3]
---	196,886.7	196,886.8	---	---	---	---	---	---

4-24-92 [3]	5-8-92 [4]	5-12-92	5-26-92	6-11-92	6-25-92	7-9-92	7-22-92	8-5-92 [1]
---	2,145.0	4,151.0	11,623.0	22,293.0	30,226.0	40,406.0	49,814.0	52,954

8-18-92 [2]								
52,954								

Notes:

1 - System Off

2 - System Restarted

3 - Flow Meter Malfunction

4 - New Meter Installed

4-0

Table 2

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 1 of 1

Total Aromatic Hydrocarbons (ppb)

Sample Point	4-26-91	5-20-91	6-17-91	7-1-91	7-30-91	1-13-92	5-8-92	8-5-92
Infuent	3,398	2,442	1,950	35.78	1,370	1,616	ND	2,545
Canister 1	2,330	1,070	977	---	425	10.7	1.7	---
Effluent	1,150	676	877	ND	3.07	12.2	ND	---
MW-2	---	ND	---	---	ND	---	---	---
MW-4	---	239	---	---	708	---	---	---
Town Well	---	ND	---	---	ND	ND	ND	8.1 *

NOTES: ND - None Detected

* - 8.1 ppb Ethyl Benzene

APPENDIX A

Analytical Results for August 1992

4-68

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD -- BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: August 21, 1992
DATE SAMPLED: August 5, 1992
DATE RECEIVED: August 5, 1992
ANALYSIS DATE: August 15, 1992

PROJECT CODE: LAHQ1873
REF.#: 34,031
STATION: Influent
TIME SAMPLED: 9:50
SAMPLER: James

Parameter	Detection Limit (ug/L)[1]	Concentration (ug/L)
Benzene	10	1,160.
Toluene	10	205.
Ethylbenzene	10	142.
Xylenes	10	588.
MTBE	10	1,230.

LINCOLN APPLIED GEOLOGY, INC.

NUMBER OF UNIDENTIFIED PEAKS FOUND: 5

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at 10% dilution.

Reviewed by

4-09

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD -- BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: August 21, 1992
DATE SAMPLED: August 5, 1992
DATE RECEIVED: August 5, 1992
ANALYSIS DATE: August 15, 1992

PROJECT CODE: LAHQ1873
REF.#: 34,032
STATION: Town Well
TIME SAMPLED: 9:50
SAMPLER: James

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	8.1
Xylenes	1	ND
MTBE	1	ND

LINCOLN APPLIED GEOLOGY

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 Compound not detected in analysis

Reviewed by

4-70

LINCOLN
APPLIED GEOLOGY, INC.
ENVIRONMENTAL CONSULTANTS

December 15, 1992

Mr. Robert Haslam
Hazardous Materials Management
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Hardwick Quick Stop, Hardwick, Vermont - Final Update

Dear Bob:

Lincoln Applied Geology, Inc. (LAG) has completed implementation of contract #0963300 to maintain and monitor the remedial system at the Hardwick Quick Stop in Hardwick, Vermont. This letter report is to serve as the final quarterly report. The remedial system has basically remained operational and functional. In early August, the deteriorated carbon canisters were replaced per your discussions with Steve LaRosa, LAG Site Manager. In late November, the original carbon canisters (white overpack drums) were cleaned out but the carbon remains on-site awaiting disposal. With the expiration of our contract we now cannot coordinate the disposal.

Attached for your information and use are: **Table 1**, Volume of Ground Waters Pumped; **Table 2**, Summary of Total Aromatic Hydrocarbons Since April 1991; and **Appendix A**, Copies of Formal Analytical Results for the November 12, 1992 Sampling.

The November results also show a significant decrease in BTEX plus MTBE constituents. However, in light of the continued presence of soluble phase contaminants in the ground waters being pumped from the Quick Stop site we recommend that treatment be continued through some type of contract extension.

We have now completed our biweekly site monitoring in fulfillment of the current contract. If you have any questions or concerns with regard to this matter, please do not hesitate to call me or Linda Revell at 453-4384. We are certainly willing and able to help you with any further contract work deemed necessary.

Sincerely,

John F. Amadon, CPSS

JFA/lr
Enclosures

RD # 1 Box 710 • Bristol, Vermont 05443 • (802) 453-4384 • FAX (802) 453-5399

4-78

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: November 24, 1992
DATE SAMPLED: November 12, 1992
DATE RECEIVED: November 12, 1992
ANALYSIS DATE: November 23, 1992

PROJECT CODE: LAHQ1529
REF.#: 38,518
STATION: Town Well
TIME SAMPLED: 10:30
SAMPLER: Holman/Gale

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:
1 None detected

...APPLIED GEOL...

Reviewed by _____

4-79

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: November 24, 1992
DATE SAMPLED: November 12, 1992
DATE RECEIVED: November 12, 1992
ANALYSIS DATE: November 23, 1992

PROJECT CODE: LAHQ1529
REF.#: 38,517
STATION: Eff Can 2
TIME SAMPLED: 10:30
SAMPLER: Holman/Gale

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	5	267.

NUMBER OF UNIDENTIFIED PEAKS FOUND: 1

NOTES:
1 None detected

Reviewed by _____

4-80

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: November 24, 1992
DATE SAMPLED: November 12, 1992
DATE RECEIVED: November 12, 1992
ANALYSIS DATE: November 23, 1992

PROJECT CODE: LAHQ1529
REF.#: 38,516
STATION: Eff Can 1
TIME SAMPLED: 10:30
SAMPLER: Holman/Gale

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	1	ND
MTBE	5	460.

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:
1 None detected

LINCOLN APPLIED GEOL

Reviewed by _____

4-81

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

GC METHOD--BTEX (BENZENE, TOLUENE, ETHYLBENZENE,XYLENES)

CLIENT: Lincoln Applied Geology
PROJECT NAME: Hardwick Quick Stop
REPORT DATE: November 24, 1992
DATE SAMPLED: November 12, 1992
DATE RECEIVED: November 12, 1992
ANALYSIS DATE: November 23, 1992

PROJECT CODE: LAHQ1529
REF.#: 38,515
STATION: Inf
TIME SAMPLED: 10:30
SAMPLER: Holman/Gale

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	72.0
Toluene	1	7.6
Ethylbenzene	1	29.3
Xylenes	1	157.
MTBE	5	548.

NUMBER OF UNIDENTIFIED PEAKS FOUND: 12

Reviewed by _____

APPENDIX A

Copies of Formal Analytical Results for the November 12, 1992 Sampling

Table 2

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 2 of 2

BTEX AND MTBE

Sample Point	11-12-92							
Infuent	814							
Canister 1	460**							
Effluent	267*							
MW-2	---							
MW-4	---							
Town Well	ND							

NOTES: ND = None Detected

** MTBE only

Table 2

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 1 of 2

BTEX AND MTBE

Sample Point	4-26-91	5-20-91	6-17-91	7-1-91	7-30-91	1-13-92	5-8-92	8-5-92
Infuent	3,398	2,442	1,950	35.78	1,370	1,616	ND	2,545
Canister 1	2,330	1,070	977	---	425	10.7	1.7	---
Effluent	1,150	676	877	ND	3.07	12.2	ND	---
MW-2	---	ND	---	---	ND	---	---	---
MW-4	---	239	---	---	708	---	---	---
Town Well	---	ND	---	---	ND	ND	ND	8.1 *

NOTES: ND = None Detected

* 8.1 ppb Ethylbenzene

Dec. 0 10
4-85

Table 1

Project: Hardwick Quick Stop Job # 9027

Location: Hardwick, Vermont Sheet # 1 of 1

Volume of Ground Water Pumped

Meter Reading (gal)

8-23-90	9-6-90	9-24-90	10-8-90	10-29-90	11-5-90	11-19-90	11-26-90	12-10-90 [1]
5,778	21,597	31,246	37,902	46,963	52,256	52,264	56,637	66,032

12-26-90 [1]	1-7-91 [2]	1-21-91 [1]	2-11-91	2-25-91	3-11-91 [1]	3-25-91 [2]	4-8-91	4-26-91
66,032	66,064	---	79,307	91,354	96,618	99,629	115,044	

5-9-91	5-20-91	6-3-91	6-17-91	7-1-91	7-15-91	7-30-91	8-16-91	12-12-91
133,509	141,544.0	149,113.0	156,607.0	166,750.0	173,679.0	181,145.5	189,334.0	196,886.0

1-3-92	1-13-92	1-30-92	2-12-92 [3]	2-20-92 [3]	3-1-92 [3]	3-16-92 [3]	4-1-92 [3]	4-14-92 [3]
---	196,886.7	196,886.8	---	---	---	---	---	---

4-24-92 [3]	5-8-92 [4]	5-12-92	5-26-92	6-11-92	6-25-92	7-9-92	7-22-92	8-5-92 [1]
---	2,145.0	4,151.0	11,623.0	22,293.0	30,226.0	40,406.0	49,814.0	52,954

8-18-92 [2]	9-2-92	9-14-92	10-28-92	11-12-92	11-24-92			
52,954	63,080	74,030	108,515	120,988	130,351			

Notes:
1 - System Off
2 - System Restarted
3 - Flow Meter Malfunction
4 - New Meter Installed

87008
MD (S)
4-86

State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Waste Management Division
103 South Main Street / West Building
Waterbury, VT 05671-0404
802-241-3888

December 11, 1996

PETER SCHUYLER
GRIFFIN INTERNATIONAL
PO BOX 943
WILLISTON VT 05495

RE: Request for Work Under the State Site Investigation Contract

Dear Mr. Schuyler:

The Waste Management Division (WMD) requests that your firm perform work under the site investigation contract. The work involves the pickup and disposal of 6 drums of used liquid phase carbon. This carbon was generated the pump and treat remedial system at the Hardwick Kwik Stop, DEC site # 87-0082. The site is on the north side of route 15 approximately 3/4 mile west of Hardwick. It is just east the Grand Union Plaza. The manager of the Kwik Stop is Valerie Simmons, her phone number is 472-6460.

This work will need to be completed before the end of the contract term of 12/31/96. Please work up a cost estimate for verbal approval prior to initiating this work.

Thank you for your assistance in this matter. If you need additional information please call.

Sincerely,

Bob Haslam
Hazardous Materials Specialist
Sites Management Section

BH/bh

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

Heindel & Noyes
PO Box 64709,
Burlington, VT 05406-4709
Attn: T Wuestenberg

PROJECT: Hardwick Kwikstop/01055
ORDER ID: 12404
RECEIVE DATE: May 11, 2001
REPORT DATE: May 22, 2001

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which include matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Asterisk in results column indicates value exceeded analytical calibration range.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

Enclosures

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

CLIENT: Heindel & Noyes
PROJECT: Hardwick Kwikstop/01055
REPORT DATE: May 22, 2001

ORDER ID: 12404
DATE RECEIVED: May 11, 2001
SAMPLER: TW

Site: MW-2
Ref. Number: 173748 Date Sampled: 5/9/01
Anal. Method: SW 8021B Time Sampled: 12:00 PM
Analyst: 917 Analysis Date: 5/19/01

Parameter	Results ug/L
MTBE	< 10 0
Benzene	< 1.0
Toluene	< 1.0
Ethylbenzene	< 1.0
Xylenes, Total	< 1.0
1,3,5 Trimethyl Benzene	< 1.0
1,2,4 Trimethyl Benzene	< 1 0
Naphthalene	< 1 0
UIP's	0.
Surrogate 1	97.%

Site: MW-5
Ref. Number: 173750 Date Sampled: 5/9/01
Anal. Method: SW 8021B Time Sampled: 12:20 PM
Analyst: 917 Analysis Date: 5/17/01

Parameter	Results ug/L
MTBE	7,600.
Benzene	1,600.
Toluene	22,300.*
Ethylbenzene	2,500.
Xylenes, Total	13,700.
1,3,5 Trimethyl Benzene	454.
1,2,4 Trimethyl Benzene	1,830.
Naphthalene	< 100.
UIP's	> 10.
Surrogate 1	99.%

Site: MW-4
Ref. Number: 173749 Date Sampled: 5/9/01
Anal. Method: SW 8021B Time Sampled: 12:10 PM
Analyst: 917 Analysis Date: 5/17/01

Parameter	Results ug/L
MTBE	4,510.*
Benzene	118.
Toluene	413.
Ethylbenzene	317.
Xylenes, Total	7,530.
1,3,5 Trimethyl Benzene	702.
1,2,4 Trimethyl Benzene	1,580.
Naphthalene	42.3
UIP's	> 10.
Surrogate 1	110.%

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

4247

Special Reporting Instructions:

Project Name: Union/ 01055 Hardwick Kwikstop	Reporting Address: H+N	Billing Address: H+N
Endyne Order ID: (Lab Use Only) 12404 (-O, -I, -S)	Company: H+N; T. Westenberg Contact Name/Phone #: 658-0520	Sampler Name: T. Westenberg Phone #: 658-0820

Ref # (Lab Use Only)	Sample Identification	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
173748	MW-2	H_2O	X		5/9/01 1200	2	40ml		19	Hcl/ice	NO
249	MW-4	↓	↓		1210	↓	↓		↓	Hcl/ice	↓
250	MW-5	↓	↓		1220	↓	↓		↓	Hcl/ice	↓

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
Tami Westenberg	5/10/01	[illegible]	5-14-01 12:20		

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRA8 Metals
4	Nitrite N	9	BOD	14	Turbidity	(19)	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	

31 Metals (As Is, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Tl, V, Zn

32 TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides) 33

34 Other

LAB USE ONLY
Delivery: Client
Temp: COOL
Comment:

(White, Yellow, Pink Copy - Laboratory / Goldenrod Copy - Client)

TAMI WUESTENBERG
Heindel and Noyes

Environmental Scientist
Research Specialist

Education:

B.S. in Environmental Policy, Michigan State University, East Lansing, MI 1995
Ongoing Graduate Coursework – University of Vermont, 8/1999-present

Certifications:

OSHA 40-hour Hazardous Waste Operations and Emergency Response Course,
October 1998, recertified January 2000
Forest Fire Fighting Red Card Certification

Employment History

Environmental Scientist, Heindel & Noyes, Burlington, VT (1998-present)
Research Specialist, Michigan State University, MI (1991-1995)
Intern, U.S. Forest Service, Klamath National Forest, Ft. Jones, CA (summer 1994)
Intern, Baxter State Park, ME (summer 1993)

Qualifications:

Work experince includes project management, fieldwork, and research specialization. Ms. Wuestenberg has more than two years of experience in consulting involving site assessments and hydrologic monitoring. Ms. Wuestenberg's experience with H&N includes: Phase I and II Environmental Assessments of industrial and commercial facilities; evaluation and interpretation of chemical and hydrological data; identification of contaminant source areas; assessment of transport and fate of contaminants; risk assessment; and litigation support. Ms. Wuestenberg also has several seasons experience working for government agencies collecting and interpreting field data. Computer knowledge consists of all Microsoft applications (Word, Excel, Access etc) GIS Software (ArcView) and some groundwater modeling (Hantush Model).

Relevant Experience:

Project Management: Develops testing designs, monitoring plans, and QA/QC plans for experimental projects. Analyzes and evaluates data, writes reports for hazardous waste investigations and compliance monitoring. Conducts Phase I and Phase II Environmental Site Assessments.

Field Work: Supervision of underground storage tank removals, remedial soil excavation, soil identification, environmental monitoring well installation, and water quality and soil sampling in various geologic conditions. Uses various data loggers, GPS and geophysics field instruments for data collection.

Research: Responsible for contacts with Vermont Department of Environmental Conservation Project Managers regarding hazardous waste sites, reviewing and mapping of all State Hazardous Waste Sites and historical research pertaining to Phase I Environmental Site Assessments, Potential Responsible Parties and other tasks as assigned. Historical work has expanded to include New Hampshire and Maine.

JEFFREY E. NOYES
Heindel and Noyes
Chief Hydrogeologist

Project Management
Hazardous Waste Investigations
Engineering Geology

Education

M.S., Geology, University of Vermont
B.S., Geology, University of Vermont

Relevant Experience

President and Chief Hydrogeologist, Heindel and Noyes (1980-Present)

Hydrogeology. Directly involved in the implementation and supervision of over 1,000 geologic, groundwater, water resource, and contaminant hydrology investigations through the northeastern United States (1980-95).

Instruction. Instructor in graduate level groundwater hydraulics seminar course at the University of Vermont. Course trained practicing professional engineers and graduate students in engineering and geology (1978-80).

Groundwater Hydrology. Groundwater hydrologist for State of Vermont; responsible for research and development activities in high capacity and conventional on-site disposal systems. Responsibilities also included acting as in-house hydrogeologic consultant throughout State government (1979-80).

State of Vermont Landfill/Hazardous Waste Program. Lead technical staff person for State of Vermont landfill/hazardous waste program. Assisted in the development of state and federal landfill regulations. Reviewed and/or direct supervision of hydrology investigations for more than 50 existing landfill/hazardous waste disposal areas. Designed and installed water quality monitoring networks at numerous waste disposal sites (1978-79).

Hazardous Waste Disposal Site. Field supervision of testing on an existing hazardous waste disposal site in West Virginia. Field investigation included installation of multi-staged water quality monitoring network in and adjacent to the waste facility. Aquifer testing with pneumatic and mechanical packers; water budget analysis (1975-78).

Groundwater Studies. Conducted numerous groundwater studies of active and abandoned waste lagoons for the coal industry. Assessed contamination from heavy metals in coal waste. Participated in groundwater investigations to limit water quality problems related to subsurface drainage of old mine shafts that were contaminating surface water resources. Performed groundwater investigations to establish dewatering schemes for deep slab foundation in active and proposed ore yards on the Great Lakes. Studies involved hydrologic evaluations of Midwestern glacial tills. Also, conducted groundwater studies related to slope stability problems in residual soils (1975-78).

Groundwater Manual. Assisted in the development of groundwater manual for U.S. Environmental Protection Agency (1975-78).

Drainage Schemes. Design and layout of a number of surface water/groundwater drainage schemes. Participated in dewatering aquifer study on Caribbean Island to determine feasibility of dewatering coral bedrock for a nuclear power plant foundation (1975-78).

Geophysical and Wastewater Studies. Numerous geophysical studies of glacial deposits using seismic and resistivity surveys. Aquifer analysis and wastewater studies throughout Vermont (1972-75).